PB89-189500

Superfund Record of Decision (EPA Region 2): Kin-Buc Landfill Operable Unit I, Edison Township, Middlesex County, New Jersey (First Remedial Action), September 1988

(U.S.) Environmental Protection Agency, Washington, DC

Sep 88

U.S. Department of Commerce
National Technical Information Service
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Office of
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EPA/ROD/R02-88/068
September 1988

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EPA

Superfund Record of Decision:

Kin-Buc Landfill, NJ

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16. Abstract (Limit: 200 words)

The 220-acre Kin-Buc Landfill consists of a number of inactive industrial and municipal waste disposal areas and is located in the Raritan River 100-year flood plain and within a coastal zone in Edison Township, Middlesex County, New Jersey. Bordering the site is an industrial park directly north, the Edison Township Municipal Landfill 600 feet to the south, marshlands to the east, and the Raritan River bordering the west. Land use within one mile of the site includes residential, light industrial, and recreational areas. Landfill operations were conducted between 1947 and 1977. Details on the owners/operators of the side are unknown prior 1968 when Kin-Buc, Inc. leased the area from Inmar Associates. According to site records, an estimated 70 million gallons of liquid wastes, including 3 million gallons of oily waste and over 1 million tons of solid waste, were disposed of between 1973 and 1976 alone. Examples of wastes received include solvents, waste oils, paint sludges, cyanides, metal stripping wastes and paint thinners. The Kin-Buc site includes three major mounds: Kin-Buc I (30 acres), Kin-Buc II (12 acres) which lies directly north of Kin-Buc I, and Mound B (9 acres) which lies southwest of Kin-Buc I adjacent to the Raritan River. Additionally, three pits of black oily leachate, Pits A, B, and C, are located at the southeastern edge of Kin-Buc I; there is a refuse-filled low-lying area between Kin-Buc I and the Edison Landfill; and (See Attached Sheet)

17. Document Analysis a. Descriptors
Record of Decision
Kin-Buc Landfill, NJ
First Remedial Action
Contaminated Media: air, gw, sediments, sw
Key Contaminants: VOCs, organics, metals (lead), PCBs

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

Availability Statement	19. Security Class (This Report) None	21. No. of Pages 85
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NSI-Z39.18) See Instructions on Reverse

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16. ABSTRACT (continued)

an area of impounded, tidally affected water, Pool C, contaminated by Kin-Buc I is adjacent to the pits. Site activities included burying and compacting contained wastes in Kin-Buc II, and discharging hazardous liquid wastes into bulldozed pits at the top of Kin-Buc I. These practices resulted in numerous citizen complaints, caused frequent major onsite fires and a number of serious occupational injuries. EPA began investigations in January 1976 and detected the discharge of hazardous substances from the facility. In February 1980, EPA began cleanup activities consisting of collection, treatment, and disposal of Pool C leachate; a drum reduction program; oily-phase leachate collection and onsite storage; and aqueous-phase leachate pretreatment, removal, and offsite treatment. In September 1980, Kin-Buc, Inc. was ordered to cap Kin-Buc I and II. This source control ROD addresses remediation of the first of two operable units, which includes Kin-Buc I and II, Pool C, and the low-lying area between Kin-Buc I and Edison Landfill. A subsequent ROD will address offsite migration controls. The primary contaminants of concern affecting the ground water, surface water, sediments, soil and air are: VOCs including benzene and toluene, other organics including PAHs and PCBs, and metals including arsenic and lead.

The selected remedial action for this site includes: installation of a slurry wall surrounding the site; RCRA capping over Kin-Buc II, a portion of the low-lying area tween Kin-Buc I and the Edison Landfill, and Pool C; maintenance and upgrading, if necessary, of the Kin-Buc I cap; collection of approximately 3 million gallons of oily-phase leachate with offsite incineration and residual disposal; collection and onsite biological or carbon treatment of aqueous-phase leachate and contaminated ground water with discharge either to surface water or POTW, and dewatering of residual sludges and offsite disposal; ground water monitoring; and O&M. The estimated present worth cost for this remedial action is between $16,290,000 and $16,635,000 with annual O&M varying from $848,000 (year 1) to $405,000 (years 12-20).

DECLARATION STATEMENT

RECORD OF DECISION

Kin-Buc Landfill - Operable Unit I, Edison Twp., Middlesex County, New Jersey

STATEMENT OF BASIS AND PURPOSE

This decision document presents the selected remedial action for the Kin-Buc Landfill-Operable Unit I in Edison Township, New Jersey; developed in accordance with CERCLA, as amended by SARA, and to the extent practicable, the National Contingency Plan. This decision is based on the administrative record for this site. The attached index identifies the items that comprise the administrative record upon which the selection of the remedial action is based.

The State of New Jersey has concurred on the selected remedy.

DESCRIPTION OF THE SELECTED REMEDY

This operable unit was developed to protect public health and the environment by controlling the major sources of contamination as well as treating leachate and contaminated groundwater to the maximum extent practicable. The operable unit is fully consistent with all planned future site activities. Future site activities include further evaluation of potential areas of contamination and developing measures to manage migration of contaminants as well as the overall site remedy.

The selected remedy for the Kin-Buc Landfill - Operable Unit I consists of the following components:

- circumferential slurry wall installation to bedrock on all of the sides of the site;
- maintenance, and upgrading if necessary, of the Kin-Buc I cap and installation of a cap in accordance with RCRA Subtitle C and State requirements on Kin-Buc II, portions of the low-lying area between Kin-Buc I and the Edison Landfill and Pool C;
- collection and off-site incineration of oily phase leachate;
- collection and on-site treatment of aqueous phase leachate and contaminated groundwater with disposal via direct surface water discharge;
- periodic monitoring and
- operation and maintenance.

Alternatively, pre-treatment of aqueous phase leachate and contaminated groundwater and discharge to the Middlesex County Utilities Authority (MCUA) publically owned treatment works (POTW) (versus treatment and direct surface water discharge) is an acceptable option should approval to discharge to the POTW be granted by the MCUA.

DECLARATION

Consistent with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 as amended by the Superfund Amendments and Reauthorization Act of 1986, and the National Oil and Hazardous Substances Pollution Contingency Plan, 40 CFR Part 300, I have determined the selected remedy is protective of human health and the environment, attains Federal and State requirements that are applicable or relevant and appropriate for this remedial action and is cost-effective. This remedy satisfies the statutory preference for remedies that employ treatment that reduces toxicity, mobility, or volume as a principal element and utilizes permanent solutions and alternative treatment technologies to the maximum extent practicable.

Because this remedy will result in hazardous substances remaining on-site above health-based levels, a review will be conducted within five years after commencement of remedial action to ensure that the remedy continues to provide adequate protection of human health and the environment.

Sept. 30, 1988
Date

William J Muszynski
William J. Muszynski, P.E.
Acting Regional Administrator

SUMMARY OF REMEDIAL ALTERNATIVE SELECTION

KIN-BUC LANDFILL - OPERABLE UNIT I

EDISON TOWNSHIP, NEW JERSEY

SITE NAME, LOCATION AND DESCRIPTION

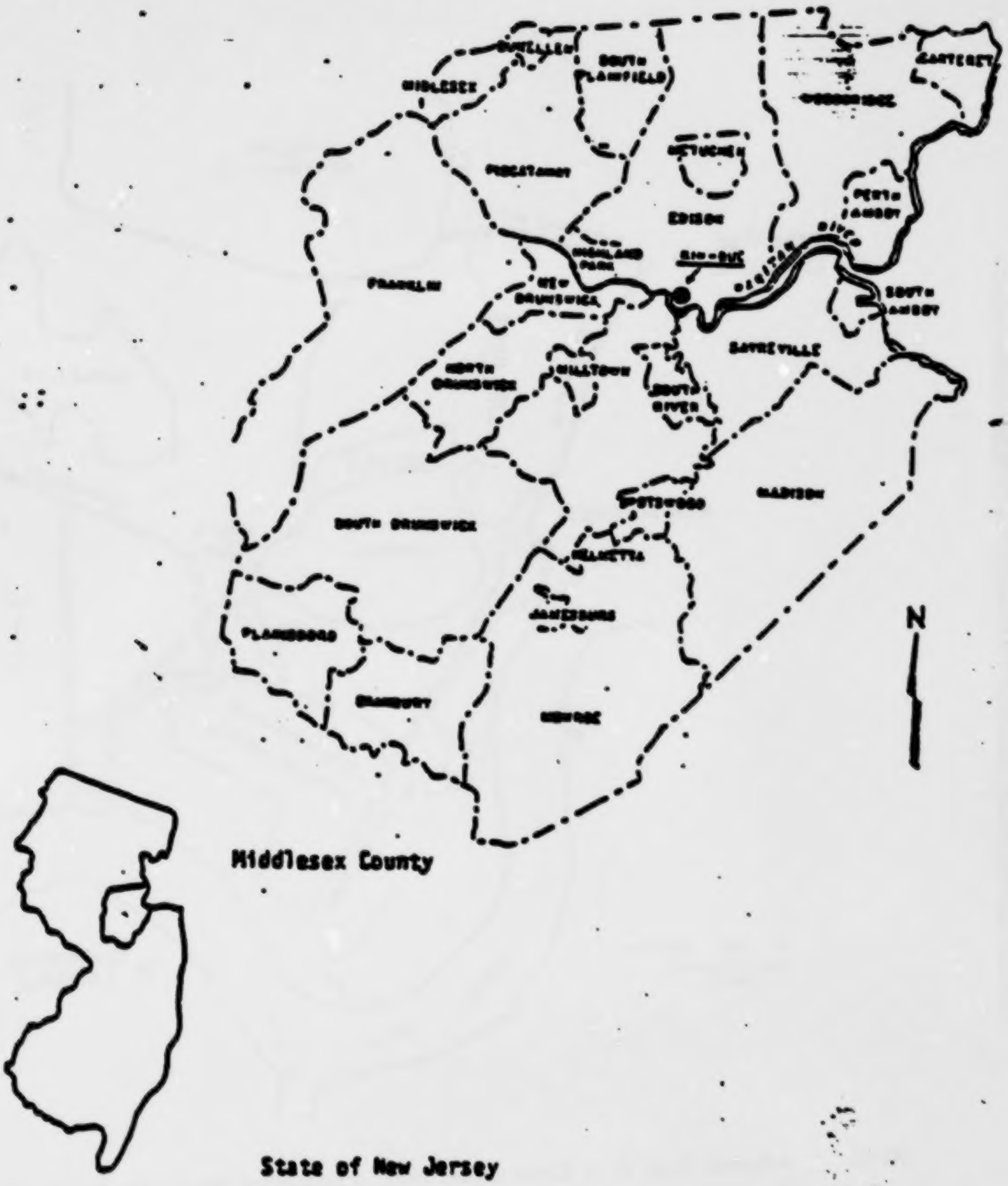
The Kin-Buc Landfill consists of a number of individual inactive disposal sites extending over 220 acres and is located at the end of Meadow Road in Edison Township, Middlesex County, New Jersey. Directly north of the site is an industrial park. The Edison Township Municipal Landfill is approximately 600 feet south of the site. Marshlands and a former borrow area are directly to the east of the site. The Raritan River borders the site on the west. Figure 1 depicts the general location of the site and Figure 2 is a site map. Figure 2 also shows that other landfills and a chemical company are within 1 mile of the site.

The Kin-Buc Landfill site includes the following components. The larger of two major mounds, designated Kin-Buc I, covers approximately 30 acres and rises to a maximum elevation of 93 feet. The other major mound, designated Kin-Buc II, covers approximately 12 acres, rises to a maximum elevation of 51 feet and is just north of Kin-Buc I. A low lying minor mound covers approximately 9 acres, rises 15 to 20 feet high and is designated as Mound B. Mound B lies west-southwest of Kin-Buc I, across the Edison Township Municipal Landfill access road and adjacent to the Raritan River. Three pits of black, oily leachate have developed at the southeastern edge of Kin-Buc I and are known as Pits A, B, and C. Adjacent to the pits is an area of impounded, tidally affected water referred to as Pool C. Marshland to the east of Pool C is cut by numerous mosquito drainage channels, with its major drainage feature being Edmonds Creek, a tidally affected shallow stream which flows into the Raritan River to the south of Kin-Buc I. Pool C is connected to Edmonds Creek by a small channel. Mill Brook, is northwest of the site, flows into Martins Creek which has been partially filled in by Kin-Buc II. Flowing west, Martins Creek runs into the Raritan River just north of Mound B. Figure 2 depicts the aforementioned site features.

Two residential populations are within 1 mile of the Kin-Buc Landfill: a densely populated residential area located northwest of the site across the New Jersey Turnpike near Meadow Road; and an apartment complex located north-northeast near the Middlesex County College. There are three additional populations to the north and east of the site. First, Middlesex County College

-1-a

Figure 1. Kin-Buc Landfill Site Location Map, Edison Township, Middlesex County, New Jersey



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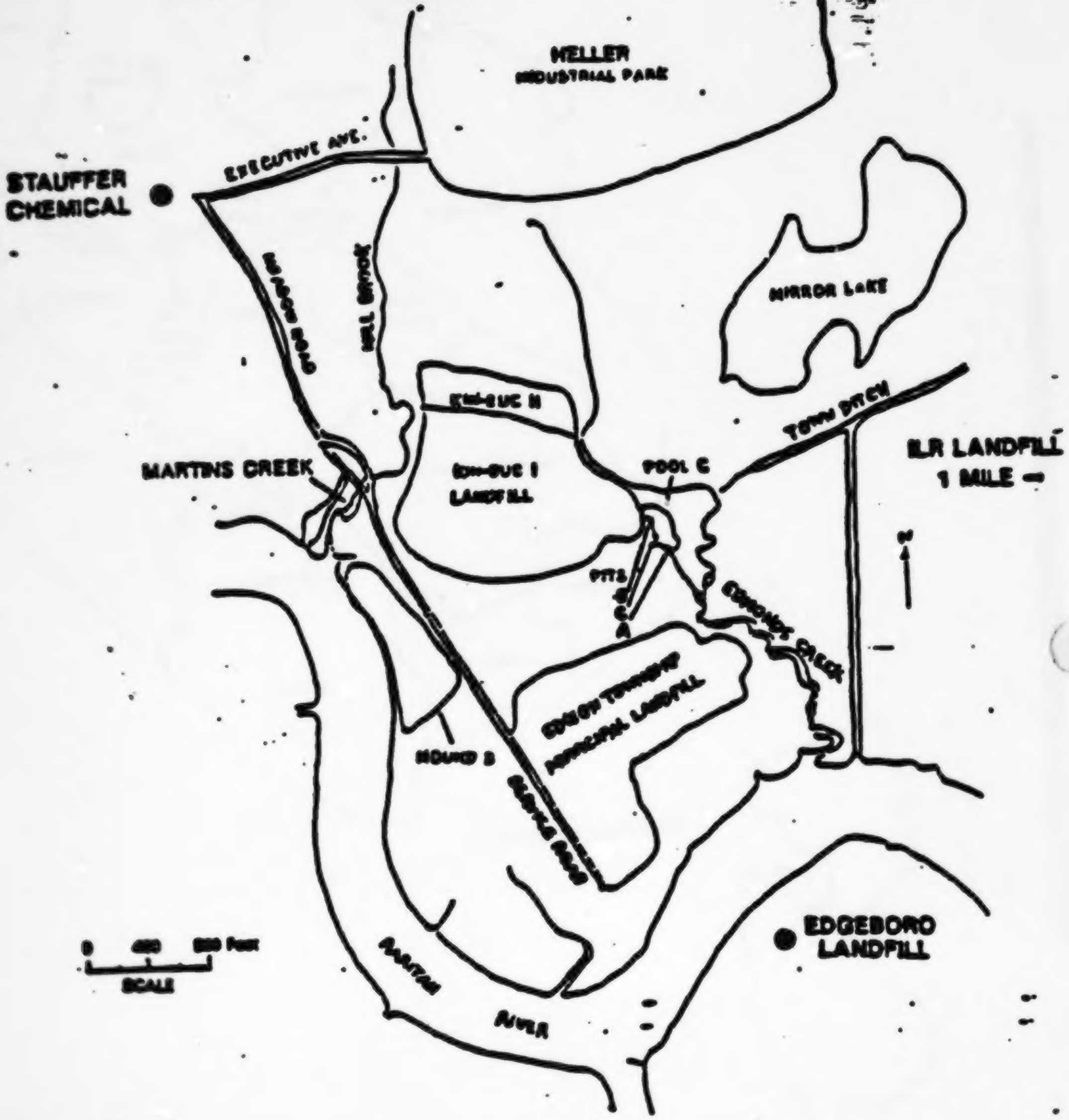
-1-b

Figure 2 Kin-Buc Landfill Site Map



Note: Adapted from GCA Corporation, 1981, Information Evaluation for the Kin-Buc Landfill, Edison, New Jersey.

is approximately three quarters of a mile north-northeast of Kin-Buc Landfill. Second, the Heller Industrial Park is a light industrial complex one-half mile north of Kin-Buc II. Third, the Mirror Lake Beach Club is approximately one-half mile northeast of the site and is used by the employees and families of the Heller Industrial Park on a seasonal basis for swimming, boating, and tennis.

Based on a review of available file information and discussions with representatives of the local health department, there are no public or private potable wells presently drawing groundwater from contaminated aquifers immediately downgradient of the Kin-Buc Landfill. Most of the public water supply in the area is predominately surface water, the majority of which comes from the Raritan River upstream of the site. Edison Township has six reserve wells screened in the Brunswick formation (bedrock) within approximately 2 to 2-1/2 miles upgradient of Kin-Buc II. According to local health officials, these wells are currently not in use. In addition, Edison Township has 700-800 private and industrial wells upgradient of the site. None of these wells are located between the site and the Raritan River.

SCOPE AND ROLE OF OPERABLE UNIT WITHIN SITE STRATEGY

EPA determined that the site should be remediated in operable units. Remediation of Operable Unit I, the subject of this Record of Decision (ROD), constitutes source control measures for the site. The components of the site addressed in Operable Unit I are as follows:

- Kin-Buc I
- Kin-Buc II
- Pool C
- Low-lying area between Kin-Buc I and the Edison Landfill

The components of the site to be addressed in Operable Unit II (the subject of a future ROD) consist of:

- Mound B;
- Raritan River;
- Mill Brook;
- Martins Creek;
- Edmonds Creek, including the connecting channel from Pool C;
- adjacent wetlands and
- groundwater contamination emanating from the site.

Operable Unit II will address the measures that may be necessary to mitigate any off-site impacts resulting from contaminant migration. EPA has determined that a Supplemental Remedial Investigation will be required to adequately characterize the nature and extent of off-site contamination. Upon completion of the Supplemental Remedial Investigation for Operable Unit II, a Feasibility Study (FS) evaluating the remedial alternatives will be conducted and the process will culminate in a subsequent ROD.

SITE HISTORY

The Kin-Buc Landfill began operating as early as 1947. During its period of operation, the landfill was utilized for disposal of municipal, industrial and hazardous waste. Detailed information on the owner/operators and site activities from 1947 to 1968 could not be located. However, the site, owned by Inmar Associates, was later leased to Kin-Buc, Inc., a division of Scientific, Inc. Kin-Buc, Inc. operated the site as a landfill from approximately 1968 to March 1977. From 1971 to 1976, the site was a state-approved landfill for industrial (solid and liquid) and municipal wastes. Kin-Buc Landfill was registered with the New Jersey Department of Environmental Protection (NJDEP), Solid Waste Administration. During this period, the site accepted hazardous waste. In 1976, the NJDEP revoked Kin-Buc's permit to operate because of violations of a number of environmental statutes.

The total quantity of waste disposed of at Kin-Buc Landfill has not been definitively determined. EPA estimates that at least 70 million gallons of liquid waste, including 3 million gallons of oily waste, and over 1 million tons of solid waste were disposed of between 1973 and 1976.

There are two major sources of information regarding the type and diversity of chemical wastes (including hazardous wastes) disposed of at Kin-Buc. First, EPA sent information request letters under CERCLA Section 104(e), to approximately 400 potentially responsible parties (PRPs). Typical categories of wastes included in responses are:

- waste lacquer residue and ferric chlorides
- solvents, strip-away wastes, oils, rubber cement
- wastewater, acetone
- waste oils
- solvent mix, silicone
- ethyl acetate, tolulol flammables
- chloroethane, cutting oils, ether, paint thinner
- cyanides
- metal stripper, cyanides, copper
- oil, alcohol, kerosene

Second, EPA compiled and summarized data from of waste shipments accepted between 1972 and 1976. Table 1 is a summary which lists 45 types of waste, (most of which would be considered hazardous) disposed at the site.

The mode of disposal operations while the site was active provides useful information to evaluate the contamination that resulted at the site. Wastes that arrived in containers were buried on-site and then compacted with bulldozers. Liquid waste was discharged into a bulldozed pit, approximately 75 to 100 feet in diameter at the top of Kin-Buc I.

Tank trucks carrying the liquid waste would stop at the entrance to the landfill where samples of the load would undergo limited testing (pH and flammability). The tank trucks then proceeded to the top of Kin-Buc I, opened their discharge ports and allowed the contents of the truck to drain into the pit.

Liquid waste also arrived in 55-gallon drums and was received along the northeast side of Kin-Buc I; an area now covered by Kin-Buc II. The drum contents were emptied into temporary storage ponds from which the contents were pumped into the pit at the top of the landfill. Once the active pit was filled, it would be closed and another one dug. These operational practices resulted in a large number of citizen complaints, caused frequent major on-site fires and a number of serious occupational injuries.

SUMMARY OF SITE CHARACTERISTICS

The Remedial Investigation (RI) includes investigations of groundwater, surface water, sediment and air. Major findings and conclusions of the RI as they pertain to the components of the site addressed in Operable Unit I are as follows:

1) The large volume of wastes in Kin-Buc I is a source of contamination of the immediately surrounding environment. These wastes included hazardous waste liquids, added to municipal and other solid wastes, with the intent that the liquids would be largely absorbed into the solid waste. Although the disposal of hazardous waste in Kin-Buc II has not been documented; liquid waste was received along the northeast side of Kin-Buc I (an area now covered by Kin-Buc II). Therefore, EPA considers there to be a high probability that hazardous substances are in or under the Kin-Buc II mound.

2) Precipitation infiltration into the refuse appears to be most significant in the lowland refuse-filled marsh area between Kin-Buc I and the Edison Landfill.

Table 1

Summary of Waste Disposed at Kin-Buc Landfill 1972 - 1976
Statistical Total for Each Chemical Type
(Sheet 1 of 2)

Chemical Type	Quantity* (1000 Gallons)
Waste Material	47580.10
Miscellaneous Waste	33405.91
Waste Water/Liquid	17249.77
Waste Sludge	11176.17
Waste Chemicals	11067.92
Acid & Alkaline Solution	5296.62
Waste Oil	2739.82
Septic	2265.39
Filter Aid	1358.97
Contaminated Dirt & Sand	1135.38
Waste/Spent Solvents	1510.89
Hazardous Materials	256.56
Waste Acid	146.68
Paint Sludge	133.65
Solids	109.56
Waste Caustic	52.10
Hydrochloric Acid	45.00
Aluminum Chloride	40.62
Waste Slop	34.87
Waste Cyanide	24.21
Nitric Acid	22.50
Tar	21.16
Sulfuric Acid	19.03
Resins	17.97
Industrial Waste	12.29
Phenolics	9.68
Chromic Acid	7.09
Waste Catalyst	6.64
Isopropyl Alcohol	6.00
Scrap Metal	5.77
Phenols	5.50
Acetic Acid	5.04
Still Bottoms	4.78

Table 1

Summary of Waste Disposed at Kin-Buc Landfill 1972 - 1976
Statistical Total for Each Chemical Type
(Sheet 2 of 2)

Chemical Type	Quantity[a] (1000 Gallons)
Styrene	
Waste Lachrymators	4.40
Gasoline	3.96
Xylene	2.50
Chloro Ethylene	2.50
Copper Solution	1.92
Formaldehyde	0.44
Jet Fuel	0.40
Path Waste Material	0.38
Lead	0.21
Lacquers	0.16
Isopropyl Ether	0.14
	0.01
Total	135790.66

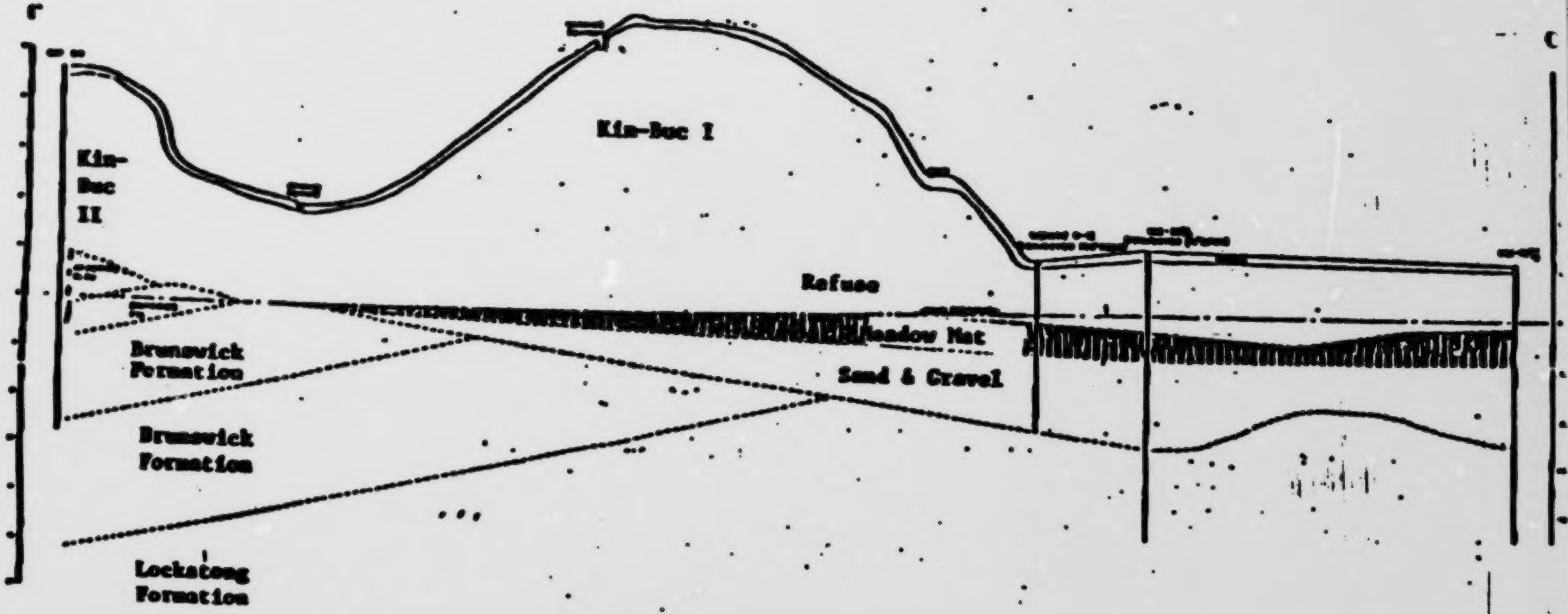
Notes:

Data compiled from a U.S. EPA Region II summary (undated) of invoices from Scientific, Inc. and SCA, Inc., of waste shipments accepted at Kin-Buc Landfill between 1972 and 1976.

[a] All waste volumes have been converted to gallons for comparison purposes as part of U.S. EPA Region II's computer summary.

Figure 3

Geological Section C-C at Kin- Buc Landfill



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Note: Reproduced from GeoEngineering, Inc., [illegible], Report of Site Investigation Kin-Buc Landfill.

3) A low permeability cap over Kin-Buc I and low permeability cover materials over Kin-Buc II have provided reduced precipitation infiltration in these areas since the cap/cover was installed.

4) Radial subsurface flow patterns in the Kin-Buc I and II mounds have been identified. Overall, groundwater flow predominates in a southerly direction to the refuse-filled, low-lying area immediately south of Kin-Buc I, and to major discharge points in the area including Mill Brook, the marsh and the Raritan River.

5) Oily phase leachate containing polychlorinated biphenyls (PCBs) has migrated from Kin-Buc I into the refuse in the low-lying area between Kin-Buc I and the Edison Landfill. Flow patterns indicate the potential for the continued migration of this leachate toward the marsh area to the east, and to the Raritan River, west of the site.

6) The most significant and obvious manifestation of the subsurface flow and a primary pathway for contaminant migration are the leachate seeps over a substantial area south of Kin-Buc I (as discussed in #4 above) and Pool C.

7) Pool C is the source of PCB contamination (up to 68 ppm) found in the sediments of Edmonds Creek. The primary source of contamination in Pool C is Kin-Buc I.

8) Leachate at the site can be separated into two phases: an oily phase and an aqueous phase. Sampling and analysis of these two phases of leachate indicate that the oily phase leachate is contaminated with PCBs (up to 5,822 ppm) and the aqueous phase leachate contains hazardous substances including, but not limited to, metals, volatile organics, base neutral compounds, acid extractable compounds, PCBs, pesticides and cyanide. Sampling and analysis of raw leachate (prior to separation) and liquids from Pits B, C and Pool C show the same types of hazardous substances. Analytic data for sampled leachate is summarized in the RI.

9) There are five stratigraphic units of concern at the site: first is the solid waste/fill material of the landfill itself, second is the meadow marsh mat which immediately underlies the southern two-thirds of Kin-Buc I, third is the sand and gravel layer which lies under the meadow marsh mat and also underlies the southern two-thirds of Kin-Buc I. Finally, two bedrock formations lie below the sand and gravel layer. Only the sand and gravel and the bedrock formations are considered aquifers. Figure 3 depicts the site stratigraphy.

10) Within the solid waste/fill material (refuse layer); two entire well series and a single well from a third series have been installed to investigate the nature of contamination. In 1981, Fred C. Hart & Associates installed 14 wells (FCHA series) under contract to EPA; 10 of which were screened in the refuse layer. Limited analysis of hydrocarbon material found in 6 of the 10 wells revealed the presence of PCBs ranging in concentration from 111-4,478 ppm. The "A" series wells, installed by AGES for the owner/operators are also screened in the refuse layer. Analytic data revealed concentrations of PCBs in the floating oil in these wells ranging from 93 to 5,791 ppm. Finally, Well GEI-6G of the GEI series, installed by GeoEngineering, Inc. for the owner/operators and screened in the refuse layer was sampled for parameters other than PCBs. Analytic data revealed concentrations of volatile organics ranging from 10 to 100 ppb and concentrations of heavy metals ranging from 10 to 210 ppb.

11) Wells screened in the sand and gravel aquifer include the entire KINWT series, NJDEP-5 and NJDEP-6 and the remaining wells in the GEI series. Contaminant concentration ranges developed from 84 samples taken between 1976 - 1984 reveal the following:

- presence of heavy metals including, but not limited to lead (up to 2.7 ppm), chromium (up to 0.64 ppm) and zinc (up to 137 ppm);
- presence of 39 organic priority pollutants including, but not limited to benzene, chlorobenzene, 4-methyl-2-pentanone, phenol and toluene which were detected at concentrations greater than 10 ppm; compounds such as vinyl chloride (up to 190 ppb), tetrachloroethene (up to 1.8 ppm) and 1,2-transdichloroethene (up to 5.4 ppm);
- concentrations of chloride (60.5 to 4,670 ppm; mean concentration = 1838 ppm) and total dissolved solids (140 to 10,360 ppm; mean concentration = 4,928 ppm), due at least in part to the brackish nature of the water.

Appendix 1 summarizes the data obtained from groundwater monitoring wells screened in the sand & gravel aquifer.

Note that KINWT 1-A is considered to be screened in the sand and gravel aquifer. However, further investigation of this well has led to the conclusion that construction of this well was faulty and that data obtained from KINWT 1-A is questionable in terms of whether or not it is indicative of the water quality in the sand & gravel aquifer. Therefore, data from this well has not been utilized in discussing the aforementioned ranges of contaminants in the sand & gravel aquifer.

12) A limited number of wells have been screened in the bedrock aquifer. Comparison of wells considered upgradient (MW-1, MW-2, MW-3 and MW-4 which are north of Kin-Buc II) versus downgradient (MW-5, GEI-9R, and GEI-12WR) indicate the following:

   - presence of heavy metals at approximately the same mean concentrations in upgradient and downgradient wells
   - an increase in the number and frequency of organic priority pollutants detected -- two contaminants in upgradient versus nine contaminants in downgradient wells.

Appendix 2 summarizes data obtained from groundwater monitoring wells screened in the bedrock aquifer. However, the nature and extent of bedrock aquifer contamination is not adequately characterized based on the data gathered to date. The nature and extent of groundwater contamination in this aquifer will be a subject of the Supplemental Remedial Investigation.

13) The only significant source of air contamination is in the immediate vicinity of the Pool C area. The major contaminants of concern in terms of air releases are volatile organics and PCBs.

14) Surface water and sediment data are presented in the RI. However, these surface waters (Raritan River, Martins Creek, Mill Brook and Edmonds Creek), their sediments and adjacent wetlands will be the subject of further studies as part of a Supplemental Remedial Investigation for Operable Unit II.

SUMMARY OF SITE RISKS

As an aid in determining the impact of the site on public health and the environment, an endangerment (risk) assessment was conducted by EPA.

Indicator contaminants utilized in the evaluation (eight indicator contaminants were chosen from over one hundred contaminants identified in the various media at the site (groundwater, surface water, sediment and air) included benzene, chloroform, 1,1-dichloroethene, PCBs, vinyl chloride, arsenic, cadmium, and lead.

The risks associated with exposure scenarios for the identified populations in the endangerment assessment were characterized and estimated. The risk characteristics and estimated risks are summarized as follows:

- At present, the contaminated aquifers (sand & gravel and bedrock) immediately downgradient of the site are not utilized as a drinking water source. If these aquifers are used in the future, a potential upper-bound excess lifeime cancer risk that exceeds 10^{-5} due to lifetime ingestion of contaminated drinking water from the bedrock aquifer exists.
- For the scenarios involving inhalation of gases released from the leachate collection pool and pits, it was concluded that on-site concentrations of contaminants measured in air neither exceed occupational standards nor pose a potential significant risk to on-site workers or persons off-site. Estimated maximum concentrations of air contaminants based on models which utilize conservative assumptions concerning human exposure indicate a potential risk to on-site workers (assuming no personal protection is used by workers) due to volatilization of PCBs from Pool C and average and maximum estimated concentrations of air contaminants considered for off-site exposure indicate potential risk due to volatile organics and PCBs.
- Workers who come in contact with the oily fraction of leachate may be subject to a potential upperbound excess lifetime cancer risk that exceeds 10^{-6}, based on the concentration of PCBs in the leachate.
- There is a potential risk from the consumption of aquatic life due to the organisms' bioaccumulation of PCBs. Estimates of the concentration of PCBs in the tissue of fish found in the Raritan River could be as high as 9 ppm, which exceeds the Food and Drug Administration limit of 2 ppm.
- Aquatic populations in the creeks adjacent to the site will be at risk due to chronic exposure to cadmium in the surface water. There is also a potential for bioaccumulation of PCBs by the aquatic life of PCBs from the sediments.
- The terrestrial populations, especially birds, may be at a limited risk due to direct contact with leachate, especially the oily phase leachate.

There are uncertainties associated with the estimates of risks and the assumptions made in developing these risks tend to be conservative. For this site, there is a level of uncertainty associated with the data and the assumptions used. The major uncertainties are summarized as follows:

- Sampling data used to evaluate exposures and risks were collected over greater than a 10-year period by numerous sampling teams. Sampling and quality assurance/quality control procedures utilized for each sampling event often were not documented. A level of uncertainty is associated with the combining of these results.
- Most of the exposure assumptions are based on values in the scientific literature or assumptions made by EPA; not site-specific data. Such site-specific data did not exist.

From the risk characteristics and estimations presented, it can be concluded that releases from the site present a potential significant risk to public health and the environment. Additionally, it must be kept in mind that large quantities of waste materials, many of which are highly toxic and potentially carcinogenic, were disposed of at the site.

ENFORCEMENT ACTIVITIES

The Kin-Buc site was operated as a landfill from approximately 1968 until March 1977. From 1971 to 1976, the site was a state-approved landfill for industrial (solid and liquid) and municipal wastes and was registered with the NJDEP Solid Waste Management Administration. During this period, the site accepted hazardous waste.

Operational practices at the landfill resulted in frequent on-site fires and a number of serious occupational injuries. Twelve to fifteen major fires occurred between 1971 and 1976. In a 1974 fire, a 55-gallon drum exploded killing a bulldozer operator. As a result of this incident, the Occupational Safety and Health Administration issued six citations for violation of the Occupational Safety and Health Act of 1970.

On a number of occasions, landfill operations were in violation of New Jersey environmental statutes. NJDEP issued Notices of Prosecution for violations including, but not limited to,

- leachate seepage into the Raritan River;
- failure to provide records of the hazardous waste received;
- failure to maintain an adequate cover over the landfill surface and
- unauthorized excavations.

EPA investigation of the site began in January, 1976 at the time of oil spill at the facility. Unpermitted point source discharges were noted by EPA site investigators, leading to a full scale monitoring investigation revealing the discharge of hazardous substances from the facility. Operation of the site was closed to receipt of further liquid wastes by July 1, 1976. Based on these and other violations, NJDEP revoked Kin-Buc's operating permit.

A November 1977 litigation report prepared by EPA led to the filing of a civil complaint against 11 owner/operators of the landfill on February 7, 1979 which directed the defendants to take corrective action under a variety of federal environmental statutues including the Federal Water Pollution Control Act, the Solid Waste Disposal Act as amended by the Resource Conservation and Recovery Act and the Rivers and Harbors Appropriation Act of 1899. In January 1980 a stipulation termed a "partial settlement" was entered into between the United States and Kin-Buc, Inc. (but not the remaining defendants) under which Kin-Buc, Inc. was to undertake installation of a cap for the landfill and conduct a long-term monitoring program. In September 1980, Kin-Buc, Inc. complied with a portion of the lawsuit by placing a synthetic membrane and clay cap on Kin-Buc I. Clay cover was also placed on Kin-Buc II. However, Kin-Buc, Inc. refused to take measures to contain the flow of leachate or clean up the area, claiming the area was not on its property.

EPA began cleanup activities at the site in February, 1980 using funds from the Federal Clean Water Act, Section 311(K). These activities consisted of collection (in 55-gallon drums), treatment and disposal of Pool C leachate. Beginning September, 1981 a drum reduction program was initiated (approximately 4000 drums had accumulated on-site). Oily phase leachate was collected and continued to be stored in drums on-site and aqueous phase leachate was pre-treated and sent to the Middlesex County Utility Authority (MCUA) treatment plant under a 1981 emergency permit issued by NJDEP.

In October, 1981 the site was placed on EPA's Superfund National Priorities List.

In September 1982, Kin-Buc, Inc. assumed the removal operation at the Pool C area that EPA had been conducting since February 1980. That agreement was implemented in late September 1982. In addition, EPA attempted negotiations with Kin-Buc, Inc. based on a proposed CERCLA §106 consent order. Negotiations were unsuccessful and led to issuance of a unilateral CERCLA §106 order (Findings of Fact, Determination and Order Docket No: II-CERCLA-30102) against the 11 initial defendants of the 1979 civil action on September 23, 1983. The unilateral CERCLA §106 order against the owner/operators required the following:

- a Removal Program which was ongoing and included:

    a) drum removal
    b) oil collection
    c) aqueous collection

- conduct of a RI/FS

- implementation of the selected remedial action and

- operation and maintenance.

In January 1984, EPA sent correspondence to approximately 400 companies who were determined to be potentially responsible parties (PRPs) at Kin-Buc based on information including, but not limited to, the business records of an owner and operator of the site (Scientific, Inc. and/or its subsidiaries, including Kin-Buc, Inc.) and the business records of SCA Services, Inc. and/or the Earthline Company, in which a subsidiary of SCA Services, Inc. held a partnership interest. The purpose of this correspondence was to notify the companies of their status as PRPs, cost recover funds expended to that point in time and request information from the PRPs under CERCLA 104(e)(1).

In May, 1984 a draft RI/FS was submitted to EPA by the owners and operators of Kin-Buc. On March 25, 1986, EPA issued an amended unilateral CERCLA §106 administrative order (Findings of Fact, Determination, and Amended Order Docket No.: II-CERCLA 60105). The purpose of this order was to "update" the 1983 CERCLA order by requiring the owners and operators to follow guidance that had been established during the interim period on the conduct of an RI/FS. The draft RI was submitted in April 1988 and the draft FS was submitted in May 1988.

The owner/operators are under unilateral order to implement the selected remedy and subject to treble damages for failure without cause to implement the selected remedy. Additionally, the site will be remediated in operable units and the PRPs have expressed a strong interest in conducting the Supplemental Remedial Investigation and FS. The PRPs are comprised mainly of two financially viable companies (Transtech Industries, Inc. formally Scientific, Inc. and Waste Management, Inc. who bought SCA Services, Inc.

DESCRIPTION OF ALTERNATIVES

The FS established five objectives for remedial action of Operable Unit I. Remedial objectives were developed based on the RI. The remedial objectives are:

- control lateral movement of contaminants within the refuse layer represented by Kin-Buc I, Kin-Buc II and the low-lying area between Kin-Buc I and the Edison Landfill;
- control manifestation of subsurface flow as surface seeps which can contribute to surface water contamination;
- control surficial contamination (i.e. Pool C and vicinity) which may contribute to air contamination;
- control migration of contaminants into the underlying sand and gravel aquifer and, in so doing, evaluate the effectiveness of the natural barriers which may exist (i.e. meadow marsh mat) and
- control of the migration of contaminants into the underlying bedrock considering the same issues noted above for the sand and gravel.

A description of each of the alternatives that were evaluated in detail in the FS are presented on the following pages. Each alternative is described in terms of its treatment components, containment components and institutional controls including operation and maintenance.

The C3 and C4 alternatives have common components developed to achieve the objectives for the remedial action. Both alternatives involve capping, containment, collection, treatment and discharge, long-term monitoring as well as operation and maintenance of the site. The key differences between the C3 and C4 alternatives are how specific components of each alternative are combined to achieve the remedial objectives. The differences are described as follows:

1) There are two options relating to the depth of installation of the circumferential slurry wall utilized for containment. The slurry wall for the C3 alternatives is installed to the bedrock in the northern portion of the site and to the meadow marsh mat in the southern portion of the site while the C4 alternatives is installed to the bedrock on all sides of the site.

FIGURE 4

MATRIX FOR COMPONENTS OF REMEDIAL ALTERNATIVES

ALTERNATIVE A - NO ACTION

ALTERNATIVE D - COMPLETE EXCAVATION

ALTERNATIVE C - CONTAINMENT, CAPPING, COLLECTION, AND DISCHARGE OF TREATED OF LEACHATE, MONITORING, OPERATION & MAINTENANCE

COMPONENTS	SLURRY WALL	CAP	DISCHARGE OF TREATED AQUEOUS PHASE LEACHATE	INCINERATION OF OILY PHASE LEACHATE	MONITORING/OPERATION MAINTENANCE
C3a	meadow mat	existing Kin-Buc I design	POTW	Yes	Yes
C3b	meadow mat	existing Kin-Buc I design	Surface Water	Yes	Yes
C3c	meadow mat	RCRA & State req.	POTW	Yes	Yes
C3d	meadow mat	RCRA & State req.	Surface Water	Yes	Yes
C4a	bedrock	existing Kin-Buc I design	POTW	Yes	Yes
C4b	bedrock	existing Kin-Buc I design	Surface Water	Yes	Yes
C4c	bedrock	RCRA & State req.	POTW	Yes	Yes
C4d	bedrock	RCRA & State req.	Surface Water	Yes	Yes

2) There are two options for construction of a cap over Kin-Buc II, portions of the low-lying area between Kin-Buc I and the Edison Landfill and Pool C. One option is to extend the existing Kin-Buc I cap design to the aforementioned areas while the other option is to cap those areas in accordance with Resource Conservation and Recovery Act (RCRA) Subtitle C and State cap requirements.

3) There are two options for the disposal of treated aqueous phase leachate. One option is complete on-site treatment and direct surface water discharge while the other option is off-site treatment at the MCUA POTW.

Figure 4 is a matrix which presents the remedial alternatives, including each of the four subalternatives developed for the C3 and C4 alternatives. Each of the four subalternatives for C3 and C4 combines the capping and disposal of treated aqueous phase leachate options discussed.

ALTERNATIVE A -- NO FURTHER ACTION WITH MONITORING

This alternative consists of the following:

- continued performance of existing site mitigative measures and monitoring activities including:
  - inspection and maintenance of Kin-Buc I cap
  - inspection and maintenance of Kin-Buc II cover materials
  - collection of aqueous phase leachate in Pool C and vicinity for off-site treatment
  - collection of oily-phase leachate in Pool C and vicinity for off-site incineration
  - a groundwater monitoring program which includes semi-annual water level measurements for eighteen wells and groundwater sampling and analysis for ten wells for the following parameters: volatile organics, pesticides, PCBs, Total Organic Carbon, Chemical Oxygen Demand, chloride, arsenic, barium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, and zinc with the ability to increase the number of wells if necessary
  - an air monitoring program which includes monthly monitoring at twenty locations on-site using an organic vapor analyzer

ALTERNATIVE C3

Four subalternatives have undergone detailed evaluation and costing in the FS.

Alternatives C3a - C3b

Components common to these two alternatives are as follows:

- circumferential slurry wall installation to bedrock in the northern portion of the site and to the meadow marsh mat in the southern portion of the site;
- collection of oily phase leachate and off-site incineration;
- maintenance, and upgrading if necessary, of the Kin-Buc I cap and extension of the existing Kin-Buc I cap design to Kin-Buc II, portions of the low-lying area between Kin-Buc I and the Edison Landfill and Pool C;
- periodic monitoring;
- operation and maintenance

The final component of the two alternatives addresses collection and treatment of aqueous phase leachate. The disposal of treated aqueous phase leachate is what differentiates C3a and C3b. Alternative C3a provides for on-site aqueous phase leachate pretreatment with discharge to the MCUA POTW. Alternative C3b provides for on-site aqueous phase leachate treatment with direct surface water discharge.

Alternatives C3c & C3d

Components common to these two alternatives are as follows:

- circumferential slurry wall installation to bedrock in the northern portion of the site and to the meadow marsh mat in the southern portion of the site;
- collection of oily phase leachate and off-site incineration;
- maintenance, and upgrading if necessary, of the Kin-Buc I cap and installation of cap in accordance with RCRA Subtitle C and State requirements on Kin-Buc II, portions of the low-lying area between Kin-Buc I and the Edison Landfill and Pool C;
- periodic monitoring and
- operation and maintenance.

The final component of the two alternatives addresses collection and treatment of aqueous phase leachate. The disposal of treated aqueous phase leachate is what differentiates C3c and C3d. Alternative C3c provides for on-site aqueous phase leachate pre-trement with discharge to the MCUA POTW. Alternative C3d provides for on-site aqueous phase leachate treatment with direct surface water discharge.

ALTERNATIVE C4

As with Alternative C3, four subalternatives have been developed for detailed evaluation and costing in the FS.

Alternatives C4a - C4b

The common components of these two alternatives are as follows:

- circumferential slurry wall to bedrock on all sides of the site;
- collection of oily phase leachate for off-site incineration;
- maintenance, and upgrading if necessary, of the Kin-Buc I cap and extension of the existing Kin-Buc I cap design to Kin-Buc II, portions of the low-lying area between Kin-Buc I and the Edison Landfill and Pool C;
- periodic monitoring and
- operation and maintenance.

The final component of the two alternatives addresses collection and treatment of aqueous phase leachate and contaminated groundwater. The disposal of treated aqueous phase leachate and contaminated groundwater is what differentiates C4a and C4b. Alternative C4a provide for on-site aqueous phase leachate and contaminated groundwater pretreatment with discharge to the MCUA POTW. Alternative C4b provides for on-site aqueous phase leachate and contaminated groundwater treatment with direct surface water discharge.

Alternatives C4c & C4d

The common components of these two alternatives are as follows:

- circumferential slurry wall to bedrock on all sides of the site;
- collection of the oily phase leachate for off-site incineration;
- maintenance, and upgrading if necessary, of the Kin-Buc I cap and installation of a cap in accordance with RCRA Subtitle C and State requirements on Kin-Buc II, portions of the low-lying area between Kin-Buc I and the Edison Landfill and Pool C;
- periodic monitoring and
- operation and maintenance.

The final component of the two alternatives addresses collection and treatment of aqueous phase leachate and contaminated groundwater. The disposal of treated aqueous phase leachate and contaminated groundwater is what differentiates C4c and C4d. Alternative C4c provides for on-site aqueous phase leachate pretreatment with discharge to the MCUA POTW. Alternative C4d provides for on-site aqueous phase leachate and contaminated groundwater treatment with direct surface water discharge.

ALTERNATIVE D -- COMPLETE WASTE EXCAVATION FOR OFF-SITE INCINERATION

This alternative would consist of the following:

- excavation and off-site incineration of the source of contamination represented by Kin-Buc I, Kin-Buc II, the Pool C environs, and the contaminated portion of the low-lying area between Kin-Buc I and the Edison Landfill which totals approximately 4.6 million cubic yards of hazardous waste
- backfilling, grading, revegetation and drainage controls
- verification sampling

SUMMARY OF COMPARATIVE ANALYSIS OF ALTERNATIVES

EPA's selection of a remedial alternative must be in accordance with the requirements of the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), 42 U.S.C. Secs. 9601 et seq., as amended by the Superfund Amendments and Reauthorization Act (SARA) (enacted October 17, 1986), and the requirements of its governing regulations, the National Oil and Hazardous Substances Pollution Contingency Plan (NCP), 40 C.F.R. Part 300.

In this section, the relative performance of the alternatives are summarized by highlighting the key differences between the alternatives in terms of the nine remedial criteria.

The nine remedial criteria summarize CERCLA §121(b)(1) (A-G) and are as follows:

1. overall protection of human health and the environment,
2. compliance with applicable or relevant and appropriate requirements (ARARs),
3. long-term effectiveness and permanence,
4. reduction of toxicity, mobility or volume,
5. short-term effectiveness,
6. implementability,
7. cost,
8. state acceptance and
9. commmunity acceptance,

1. OVERALL PROTECTION OF HUMAN HEALTH AND THE ENVIRONMENT

This criterion addresses whether or not a remedy provides adequate protection and describes how risks posed through each pathway are eliminated, reduced, or controlled through treatment, engineering controls or institutional controls.

Alternatives C4a-d & C3a-d - Containment, Capping, Collection, Treatment and Discharge

Containment

Circumferential slurry wall installation to bedrock on all sides (Alts. C4a-d) eliminates the potential for continued uncontrolled releases of contaminants to both the bedrock aquifer and the surrounding environment, including adjacent wetlands and surface waters. Therefore, risks to public health and the environment in current and future use exposure scenarios would be mitigated, resulting in protection of public health and the environment.

Circumferential slurry wall installation to the meadow marsh mat (Alts. C3a-d) would not adequately control releases of contaminants to the environment including adjacent wetlands and surface waters. The vertical migration of contaminants from the refuse layer through the meadow marsh mat into the sand and gravel and potentially the bedrock aquifer as well as lateral migration of contaminants to adjacent wetlands and surface waters would continue. Risks to the environment under current use exposure scenarios would not be completely mitigated. Risks to public health under future use scenarios involving ingestion of contaminated groundwater (if used for drinking purposes) would not be mitigated. Therefore, overall protection of public health and the environment is not achieved.

Capping

A cap utilizing the existing Kin-Buc I design for Kin-Buc II, portions of the low-lying area between Kin-Buc I and the Edison Landfill and Pool C appears to be protective of public health and environment, pending verification of the integrity of the Kin-Buc I cap (Alts. C3a, C3b, C4a, C4b).

Cap design in accordance with RCRA Subtitle C and State requirements (Alts. C3c, C3d, C4c, C4d) on Kin-Buc II, portions of the low-lying area between Kin-Buc I and the Edison Landfill and Pool C may afford a greater level of protection since such a cap design includes a thicker layer of clay and topsoil than the existing Kin-Buc I cap design.

Collection/Treatment/Discharge

Collection, treatment and discharge (whether it is direct surface water discharge or discharge to the MCUA POTW) processes are the same for the the C4a-d and C3a-d alternatives. The C4a-d and C3a-d alternatives collect oily phase leachate and incinerate it off-site. However, the C4 alternatives collect, treat and discharge aqueous phase leachate as well as contaminated groundwater from the sand and gravel aquifer. The C3 alternatives collect, treat and discharge only aqueous phase leachate. Therefore, the C4 alternatives are considered more protective of public health and the environment because aqueous phase leachate and contaminated groundwater will be treated.

Alternative D -- Complete Excavation with Off-site Incineration

Implementation of the complete excavation with off-site incineration alternative would mitigate the long-term risks to public health and the environment posed by the components of Operable Unit I. The source of contamination at the site would be removed. However, the short-term risks and impacts associated with this alternative are so great that selection of this alternative would be less protective of public health and the environment than other alternatives evaluated. The same level of long-term protection of public health and the environment can be achieved without the substantial short-term risks and implementability problems through the other remedial alternatives evaluated.

Alternative A -- No Further Action with Monitoring

This alternative would not result in reducing the magnitude of public health and environmental risk associated with the components of Operable Unit I. Specifically, environmental releases that would continue as a result of implementation of this alternative may subject workers who come in contact with the oily phase leachate to a potential upperbound excess lifetime cancer risk that exceeds 10^{-6}, based on the concentration of PCBs in the leachate. Models estimating average and maximum concentrations of air contaminants off-site indicate a potential risk due to exposure of volatile organics and PCBs. However, on-site concentrations of contaminants measured in air since the cap was installed over Kin-Buc I in 1980 neither exceed occupational standards nor pose a potential significant risk to on-site workers (who wear proper personal protection as part of a health and safety plan) or persons off-site. The continued release of contaminants that would occur despite implementation of this alternative poses a potential risk with respect to ingestion of groundwater under a future use scenario. At present, both the sand and gravel aquifer (shown to be contaminated) and the bedrock aquifer (a component of the Supplemental Remedial Investigation for Operable Unit II which could be potentially contaminated due to its connection to the sand and gravel aquifer) are not utilized immediately downgradient of the site as a drinking water source. However, if the bedrock aquifer is used in the future, there is an estimated potential upperbound excess lifetime cancer risk that exceeds 10^{-5} due to lifetime ingestion of contaminated drinking water from the bedrock aquifer.

Aquatic populations in the adjacent surface waters will be at risk due to chronic exposure to cadmium in the surface water. Terrestrial populations, especially birds may be at limited risk due to direct contact with leachate.

The long-term public health and environmental impacts of implementation of this alternative are significant if no further action is taken and source control is not achieved.

2. COMPLIANCE WITH ARARs.

This criterion addresses whether or not a remedy will meet all of the applicable or relevant and appropriate requirements (ARARs) of other environmental statutes.

During development of the FS, ARARs and Criteria, Guidances and Advisories to be considered (TBCs) were established for Operable Unit I site remediation. Appendix 3 represents Federal and State ARARs and TBCs as well as their potential applicability to those alternatives that have undergone a detailed evaluation in the FS.

Alternatives C4a-d & C3a-d - Containment, Capping, Collection, Treatment and Discharge

Containment

Circumferential slurry wall installation to bedrock on all sides (Alts. C4a-d) in conjunction with collection and treatment are expected to meet ARARs for releases to groundwater and surface water.

Circumferential slurry wall installation to the meadow marsh mat (Alts. C3a-d) would not provide for attainment of all ARARs because releases of contaminants from the refuse layer through the meadow marsh mat to the underlying sand and gravel aquifer, potentially to the bedrock aquifer and to adjacent surface waters would continue. Contaminated groundwater in the sand and gravel aquifer would not be remediated by Alternatives C3a-d. Therefore, ARARs for releases to groundwater and surface water are not expected to be met.

Capping

A cap utilizing the existing Kin-Buc I design for Kin-Buc II, portions of the low-lying area between Kin-Buc I and the Edison Landfill and Pool C (Alts. C3a, C3b, C4a, C4b) would not meet State ARARs for cap design.

Cap design in accordance with RCRA Subtitle C and State requirements State (Alts. C3c, C3d, C4c, C4d) for Kin-Buc II, portions of the low-lying area between Kin-Buc I and the Edison Landfill and Pool C would meet ARARs.

Collection/Treatment/Discharge

The collection, treatment and discharge (whether it is direct surface water discharge or discharge to the MCUA POTW) processes are the same for the C4a-d and C3a-d alternatives. Both the C4a-d and C3a-d alternatives collect oily phase leachate and incinerate it off-site. However, the C4 alternatives collect, treat and discharge aqueous phase leachate as well as contaminated groundwater from the sand and gravel aquifer. Therefore, the collection of aqueous phase leachate and contaminated groundwater in conjunction with treatment and discharge would result in meeting ARARs for releases to groundwater and surface water. In comparison, the C3 alternatives collect, treat and discharge only aqueous phase leachate and contaminated groundwater would not be collected for these alternatives. ARARs would not be met because releases to groundwater and surface water would continue.

Alternative D -- Complete Excavation with Off-site Incineration

Implementation of this alternative would result in total source removal of the components of Operable Unit I. Compliance with all Federal and State ARARs as well as TBCs is expected.

Alternative A -- No Further Action with Monitoring

Implementation of this alternative would not result in meeting the Federal and State ARARs or TBCs. Federal and/or State ARARs as well as TBCs would not be met under RCRA (e.g. capping, closure requirements). The continued release of contaminants to groundwater and surface waters would not comply with Federal and State groundwater or surface water ARARs.

3. LONG-TERM EFFECTIVENESS AND PERMANENCE.

This criterion refers to the ability of a remedy to maintain reliable protection of human health and the environment over time, once clean-up goals have been met.

Alternatives C4a-d & C3a-d - Containment, Capping, Collection, Treatment and Discharge

Containment

Utilization of a circumferential slurry wall installed to bedrock on all sides (Alts. C4a-d), in conjunction with the other components of the remedy is the most effective strategy to prevent the migration of contaminants both laterally and vertically to groundwater, surface waters, and adjacent wetlands.

Installation of a circumferential slurry wall to the meadow marsh mat (Alts. C3a-d) would rely on the meadow marsh mat as an effective barrier to migration of contaminants from the refuse layer to the sand and gravel aquifer. Available information including sampling and analysis data for the sand and gravel aquifer and physical analysis of the meadow marsh mat indicate that the meadow marsh mat is neither continuous nor effective in precluding downward migration from the refuse layer to the sand and gravel aquifer. Releases to the sand and gravel aquifer and potentially the bedrock aquifer as well as to adjacent surface waters would continue. Therefore, this containment strategy would not provide long-term effectiveness.

Capping

A cap utilizing the existing Kin-Buc I design for Kin-Buc II, portions to the low-lying area between Kin-Buc I and the Edison Landfill and Pool C is expected to provide long-term effectiveness, pending verification of the integrity of the Kin-Buc I cap (Alts. C3a, C3b, C4a, C4b).

Installation of a cap designed in accordance with RCRA Subtitle C and State requirements on Kin-Buc II, portions of the low-lying area between Kin-Buc I and the Edison Landfill and Pool C (Alts. C3c, C3d, C4c, C4d) is expected to provide greater long-term effectiveness and permanence in terms of preventing precipitation infiltration because the cap design includes a thicker layer of clay and topsoil than the existing Kin-Buc I cap design.

Collection/Treatment/Discharge

The collection, treatment and discharge (whether it is direct surface water discharge or discharge to the MCUA POTW) processes are the same for the C4a-d and C4a-d alternatives. Both the C4a-d and C3a-d alternatives collect oily phase leachate and incinerate it off-site. However, the C4a alternatives collect, treat and discharge aqueous phase leachate as well as contaminated groundwater from the sand and gravel aquifer. The C3 alternatives collect, treat and disharge only aqueous phase leachate. Therefore, the C4 alternatives are considered to provide greater long-term effectiveness because both aqueous phase leachate and contaminated groundwater will be treated.

Alternative D -- Complete Excavation with Off-site Incineration

Incineration of the excavated wastes would result in a permanent reduction in the toxicity, mobility and volume of contaminants from the components of Operable Unit I. There would be total source removal and site restoration of the components of Operable Unit I upon successful completion of this remedy. The potential for exposure of human and environmental receptors to contaminants from Operable Unit I components would be mitigated.

Alternative A -- No Further Action with Monitoring

The continued performance of existing site mitigative measures and monitoring activities would not be sufficiently effective for the long-term protection of public health and the environment. There would be inadequate source control and continued environmental releases. The magnitude of the public health and environmental risks would remain unchanged.

4. REDUCTION OF TOXICITY, MOBILITY OR VOLUME

Alternatives C4a-d & C3a-d - Containment, Capping, Collection, Treatment and Discharge

Installation of a circumferential slurry wall to bedrock (Alts. C4a-d) will provide for the maximum reduction in the vertical and lateral mobility of aqueous phase leachate as well as contaminated groundwater.

Installation of a circumferential slurry wall to the meadow marsh mat (Alts. C3a-d) will not reduce the mobility of contaminants in the sand and gravel aquifer since containment of contaminants in the sand and gravel aquifer is not addressed.

Capping

The capping of Kin-Buc II, portions of the low-lying area between Kin-Buc I and the Edison Landfill and Pool C utilizing the existing Kin-Buc I design (Alts. C3a, C3b, C4a, C4b) will reduce the mobility of contaminants by preventing precipitation infiltration.

The capping of Kin-Buc II, portions the low-lying area between Kin-Buc I and the Edison Landfill and Pool C utilizing a cap design in accordance with RCRA Subtitle C and State requirements (Alts. C3c, C3d, C4c, C4d) is expected to provide a greater reduction in mobility of contaminants due to precipitation infiltration because the cap design includes a thicker layer of clay and topsoil than the existing Kin-Buc I cap design.

Collection/Treatment/Discharge

The C4a-d alternatives include collection and off-site incineration of the oily phase leachate, which provides maximum reduction of toxicity, mobility and volume of contaminants. For the C4a-d alternatives, the collection, treatment and discharge (whether it's direct surface water discharge or discharge to the MCUA POTW) of aqueous phase leachate as well as contaminated groundwater from the sand and gravel aquifer provides the most significant reduction of the toxicty, mobility and volume of aqueous phase leachate and contaminated groundwater.

The C3a-d alternatives include collection and off-site incineration of oily phase leachate which provides maximum reduction of toxicity, mobility and volume of contaminants. However, because the C3a-d alternatives collect and treat only aqueous phase leachate and not contaminated groundwater; the reduction of toxicity, mobility and volume of contaminants in groundwater is not addressed.

Alternative D -- Complete Excavation with Off-site Incineration

Complete excavation with off-site incineration would permanently reduce the toxicity, mobility and volume of contaminants. Preliminary estimates of the waste quantity to be excavated at Kin-Buc for off-site incineration totals approximately 4.6 million cubic yards. Off-site incineration would result in no residual contamination remaining from the components of Operable Unit I.

Alternative A -- No Further Action with Monitoring

The existing cap over Kin-Buc I and the cover materials over Kin-Buc II provide reduced precipitation infiltration in these areas and thus, a reduction in the mobility of contaminants in the refuse layer. However, other areas of the site which are considered components of Operable Unit I such as the low-lying area between Kin-Buc I and the Edison Landfill and Pool C environs have not been capped. There would be no reduction of vertical mobility due to precipitation infiltration in these areas. In fact, there may be increased mobility of some contaminants from the surface to the subsurface as a result of precipitation infiltration. Existing aqueous and oily phase leachate collection controls in Pool C and vicinity reduce the lateral mobility of contaminants into Edmonds Creek, an adjacent surface water.

Collection and off-site treatment of aqueous phase leachate and collection and off-site incineration of oily phase leachate provides for a reduction in the toxicity and volume of collected leachate. However, the current site collection controls are passive systems and there is a significant volume of contaminated leachate that could be remediated more actively. In addition, there would be no active reduction in the toxicity, mobility and volume of contaminated groundwater in the sand and gravel aquifer.

5. SHORT-TERM EFFECTIVENESS

This criterion addresses the period of time needed to achieve protection and any adverse impacts on human health and the environment that may be posed during the construction and implementation period, until clean-up goals are achieved.

Alternatives C4a-d & C3a-d - Containment, Capping, Collection, Treatment and Discharge

Containment

Potential short-term risks to worker health and safety and the environment associated with the C4 and C3 alternatives pertain to excavation during installation of the slurry wall. These risks can be effectively mitigated through the use of appropriate controls (e.g. drainage controls, dust suppressants) and by strict adherence to proper health and safety protocols during slurry wall installation.

Capping

Short-term risks with capping the site utilizing either the existing Kin-Buc I cap design or a design in accordance with RCRA Subtitle C and State requirements involve construction of the cap on Kin-Buc II, portions of the low-lying area between Kin-Buc I and the Edison Landfill and Pool C exist to worker health and safety and the environment. These risks can be effectively mitigated through the use of appropriate controls (e.g. dust suppressants) and by strict adherence to proper health and safety protocols during cap installation.

Collection/Treatment/Discharge

Short-term risks to worker health and safety and the environment are associated with installation of the collection system due to excavation activities for both the C4 and C3 alternatives. These risks can be mitigated through the use of appropriate controls (drainage controls, dust suppressents) and adherence to proper health and safety protocols during construction activities.

Alternative D -- Complete Excavation with Off-site Incineration

There are severe short-term impacts associated with this alternative. A 4.6 million cubic yard excavation of a wide variety of hazardous waste will require extensive safety planning. Despite best safety planning efforts, on-site workers utilizing Level B (self-contained breathing apparatus) or Level A (full encapsulation and protection from any body contact) would still be at significant risk in working with such a large volume of unknown hazardous material that potentially contains explosive, reactive, corrosive, flammable or highly toxic material. During the waste excavation, the potential for toxic air emissions, a fire or explosion would be high. This would pose a potentially significant risk to residents in close proximity to the site as well as on-site workers. Additionally, releases caused by accidental spills or escape of contaminated run-off to the surrounding environment, including adjacent surface waters could occur during excavation despite control measures that would be implemented to prevent such releases.

Other constraints concern transport of excavated waste off-site. Based upon the total volume of wastes to be excavated (over an estimated five-year excavation period), and assuming a 1600 pound per cubic yard in-place waste density, and a 20 ton vehicle pay load; then approximately 37,000 truck trips to an incinerator(s) would be required on a yearly basis. This volume of truck traffic is anticipated to be disruptive to nearby residents and poses a potential risk due to highway accidents.

Additionally, the length of time it may take to implement and complete this alternative is a constraint. A considerable amount of time will be required before actual waste excavation can commence (estimated to be three years) due to the following factors: 1) the time to design and construct all the necessary on-site facilities (storage, staging, decontamination facilities, haul roads etc.), 2) the time to gain all necessary regulatory approvals and 3) the time it may take to obtain adjacent properties to provide space for the necessary on-site facilities. Furthermore, it is projected that it will take five years from the time actual excavation commences until excavation is completed. This projection is based upon an estimate of the minimum amount of time which may be required using conventional excavation equipment to excavate the estimated 4.6 million cubic yards of waste and perform all necessary functions (segregaton, testing, packaging, etc.) for off-site incineration. This estimate neither considers any emergencies, unplanned events which could temporarily halt excavation nor the time it will take to actually incinerate all the waste.

Based upon the constraints discussed above, the short-term risks to public health and the environment are substantial.

Alternative A -- No Further Action with Monitoring

There would be minimal short-term effectiveness associated with this alternative. Although existing site mitigative measures include access restriction via a perimeter fence, cap/cover maintenance and, collection, treatment and disposal of aqueous and oily phase leachate; total source control is not achieved by the No Further Action with Monitoring alternative. Public health and environmental risks associated with components of Operable Unit I would not be mitigated by the implementation of this alternative.

6. IMPLEMENTABILITY

This criterion addresses the technical and administrative feasibility of a remedy, including the availability of materials and services needed to implement a particular option.

Alternatives C4a-d & C3a-d - Containment, Capping, Collection, Treatment and Discharge

Containment

Constraints associated with installing a slurry wall for either alternatives C4a-d and C3a-d include the following:

- o pre-construction compatability testing and subsurface investigations for the slurry wall;
- o construction of a work platform for slurry wall installation which will require extensive excavation of hazardous waste;
- o on-site workers and residents health and safety considerations in light of the excavation work to be performed

Capping

Constraints associated with construction of a cap utilizing RCRA Subtitle C and State requirements (Alts. C3c, C3d, C4c, C4d) would involve obtaining a larger volume of clay and topsoil to complete cap construction versus utilizing existing Kin-Buc I cap design for Kin-Buc II, portions of the low-lying area between Kin-Buc I and the Edison Landfill and Pool C.

Collection/Treatment/Discharge

Constraints associated with implementing the C4a-d and C3a-d alternatives include the following:

- pre-design treatability studies for the aqueous phase leachate treatment system,

- construction of a work platform, and subsurface collection system which will require extensive excavation of hazardous waste,
- on-site workers, POTW workers and residents health and safety consideration in light of the excavation work to be performed.

On-site treatment of aqueous phase leachate (C3 alternatives) and contaminated groundwater (C4 alternatives) with direct surface water discharge requires a more complex on-site treatment system than the treatment system anticipated for pretreatment and discharge to the MCUA POTW. Additional constraints specific to implementing an on-site treatment system with direct surface water discharge include:

- generation of additional waste streams (e.g. sludges) that require greater handling, operation and maintenance, space requirements and proper treatment and/or disposal and
- the potential need to acquire adjacent properties for construction of the on-site treatment system necessary for surface water discharge.

The final design of a system for on-site treatment of aqueous phase leachate and contaminated groundwater (C4 alternative) with discharge to a POTW or surface waters is dependent or treatability studies necessary for various unit processes as well as specific discharge permit requirements by MCUA (to go to the POTW) or the State of New Jersey Department of Environmental Protection (to go to surface waters). Permit levels for discharge to surface water or the POTW will incorporate site-specific ARARs.

The time to implement either alternative is estimated to take one to one and one-half years but assumes initation of construction activities at the beginning of the construction season and allows for scheduling contingencies that may extend the construction time frame. Long-term management and monitoring is required for both alternatives.

Alternative D -- Complete Excavation with Off-site Incineration

Potential constraints in implementing this alternative are as follows:

- the complexity of operations and technologies required to protect considering the large volume and diversity of wastes;
- the need to acquire adjacent properties, as sufficient space does not exist on-site to accomodate construction of the necessary facilities;

- the time to design and construct all the necessary on-site facilities (storage, staging, haul roads, etc.);
- the time to gain all necessary regulatory approvals and implement the remedy;
- the availability of sufficient and suitable incineration facilities and
- cost.

The techniques to be employed have been extensively and successfully used at other hazardous waste sites. The combination of these technologies to construct a complex facility to excavate and transport wastes to an incinerator is not widely employed due to the risks to on-site workers and nearby residents, short-term environmental impacts and costs.

Preliminary estimates of the waste quantity to be excavated at Kin-Buc for off-site incineration includes:

Wastes contaminated with PCB concentratons > 50 ppm	400,000 cubic yds.
Wastes contaminated with PCB concentrations < 50 ppm	4,205,000 cubic yds.
100,000 drums of unidentified liquids	27,000 cubic yds.
TOTAL	4,632,000 cubic yds.

However, due to existing disposal demands placed upon RCRA incinerators, it would be difficult for a single incinerator facility to dedicate itself to handling such a large volume of hazardous waste.

Furthermore, even if a single incinerator facility (regardless of whether or not it is PCB-approved or non-PCB approved) was capable of dedicating itself to the destruction of Kin-Buc wastes, there does not appear to be a RCRA incinerator in the country that is large enough to handle the disposal of the wastes from Kin-Buc within a reasonable time period. Considering the estimated large volume of wastes present at the Kin-Buc site requiring incineration under this alternative, even if the largest incinerator facility were capable of dedicating itself to Kin-Buc, it is estimated that it may take at least 35 years to complete incineration.

Alternative A -- No Further Action with Monitoring

The relative ease of implementing this alternative is evidenced by its successful performance to date. There is operational reliability of the existing monitoring wells. The aqueous and oily phase leachate collection relies on proven technologies. Readily available personnel and equipment exists on-site for the continued performance of this alternative.

7. COST

This criterion includes estimated capital, operation and maintenance costs and net present worth costs. These costs are summarized in Table 2 for Alternatives A, C3 (including subalternatives), C4 (including subalternatives) and D. Additional cost details are provided below:

Alternatives C4a-d & C3a-d - Containment, Capping, Collection, Treatment and Discharge

Annual operation and maintenance costs for Alternatives C4a and C4c vary over the 30-year operational period from $762,000 in Year 1 to $398,000 in Years 12-30.

Annual operation and maintenance costs for Alternatives C4b and C4d vary over the 30-year operational period from $848,000 in Year 1 to $405,000 in Years 12-30.

Annual operation and maintenance costs for Alternatives C3a and C3c vary over the 30-year operational period from $753,000 in Years 1 to Years 12-30.

Annual operation and maintenance costs for Alternatives C3b and C3d vary over the 30-year operational period from $397,000 in Year 1 to Years 12-30.

Alternative D -- Complete Excavation with Off-site Incineration

For the purpose of calculating present worth, the capital cost for construction of on-site structures was equally distributed over the first three years of the implementation period, and the remaining costs were equally distributed over the last five years of the eight-year implementation period.

Table 2.

COST SUMMARY OF REMEDIAL ALTERNATIVES
KIN-BUC FEASIBILITY STUDY

Alternative[1]	Capital ($1,000)	Annual[2] O & M ($1,000)	Present Worth ($1,000)
No further action with monitoring (Alternative A)	------	432	4,075
Circumferential wall to meadow mat on the south and rock on the north (Alternative C3)			
Sub-alternative a	7,425	varies	12,027
Sub-alternative b	(x) 8,139 (y) 7,863	varies varies	(x) 13,085 (y) 12,721
Sub-alternative c	9,890	varies	14,492
Sub-alternative d	(x) 10,603 (y) 10,329	varies varies	(x) 15,549 (y) 15,187
Circumferential wall to rock on all sides (Alternative C4)			
Sub-alternative a	8,303	varies	13,112
Sub-alternative b	(x) 9,016 (y) 8,741	varies varies	(x) 14,170 (y) 13,806
Sub-alternative c	10,767	varies	15,434
Sub-alternative d	(x) 11,481 (y) 11,206	varies varies	(x) 16,635 (y) 16,240
Waste excavation for off-site incineration (Alternative D)	7,023,455	------	4,001,938

Notes:

1. Sub-Alternative Abbreviations
   a. On-site aqueous pre-treatment with discharge to MCUA; extension of existing Kin-Buc I cap design
   b. On-site aqueous treatment with direct surface water discharge; extension of existing Kin-Buc I cap design
   c. On-site aqueous pre-treatment with discharge to MCUA; RCRA cap.
   d. On-site aqueous treatment with direct surface water discharge; RCRA cap.

2. Annual O & M costs of slurry wall alternatives vary over the 30-year operational period. See Section 5.3.5 of the report for annual O & M costs.

3. x = Anaerobic/Aerobic Treatment
   y = Powdered Activated Carbon Treatment (PACT)

Alternative A -- No Further Action with Monitoring

The potential for future remedial action would be determined based on groundwater monitoring, air monitoring, continued performance of existing site mitigative measures and land use changes in the vicinity of the site. Changes in any of the aforementioned factors that increase the magnitude of risk to public health or the environment would require a re-assessment of the need for further remedial action. Based on the FS, present worth costs of any further remedial action could range from approximately tweleve millon to four billion dollars depending on the remedial alternative implemented.

8. STATE ACCEPTANCE

This criterion is utilized to support the Agency's comments.

Alternatives C4a-d & C3a-d - Containment, Capping, Collection Treatment and Discharge

Containment

NJDEP concurs with the need to install a circumferential wall to bedrock (Alts. C4a-d) versus to the meadow marsh mat (Alts. C3a-d) because a slurry wall to bedrock is more protective, provides greater reduction in mobility of contaminants both laterally and vertically and prevents uncontrolled releases to groundwater and surface water.

Capping

NJDEP concurs with the need to install a cap in accordance with RCRA Subtitle C and State requirements on Kin-Buc II, portions of the low-lying ara between Kin-Buc I and the Edison Landfill and Pool C.

Collection/Treatment/Discharge

NJDEP concurs with the need for collection and off-site incineration of oily phase leachate as well as collection, treatment and discharge (whether it is direct surface water discharge or discharge to the MCUA POTW) of aqeuous phase leachate and contaminated groundwater.

Alternative D -- Complete Excavation with Off-site Incineration

State acceptance of this alternative is not anticipated due to the significant public health and environmental risks associated with excavation of such a large volume of hazardous waste.

Alternative A -- No Further Action with Monitoring

This alternative would not adequately reduce the public health and environmental risks posed by the components of Operable Unit I. In addition, neither Federal or State ARARs nor TBCs would be met. Therefore, there would not be State acceptance of this alternative.

9. COMMUNITY ACCEPTANCE

This criterion summarizes the public's general response to the alternatives described in the Proposed Remedial Action Plan and RI/FS report. Specific responses to public comments are addressed in the Responsiveness Summary section of the ROD. A community relations history is presented in Appendix 4.

Alternatives C4a-d & C3a-d - Containment, Capping, Collection Treatment and Discharge

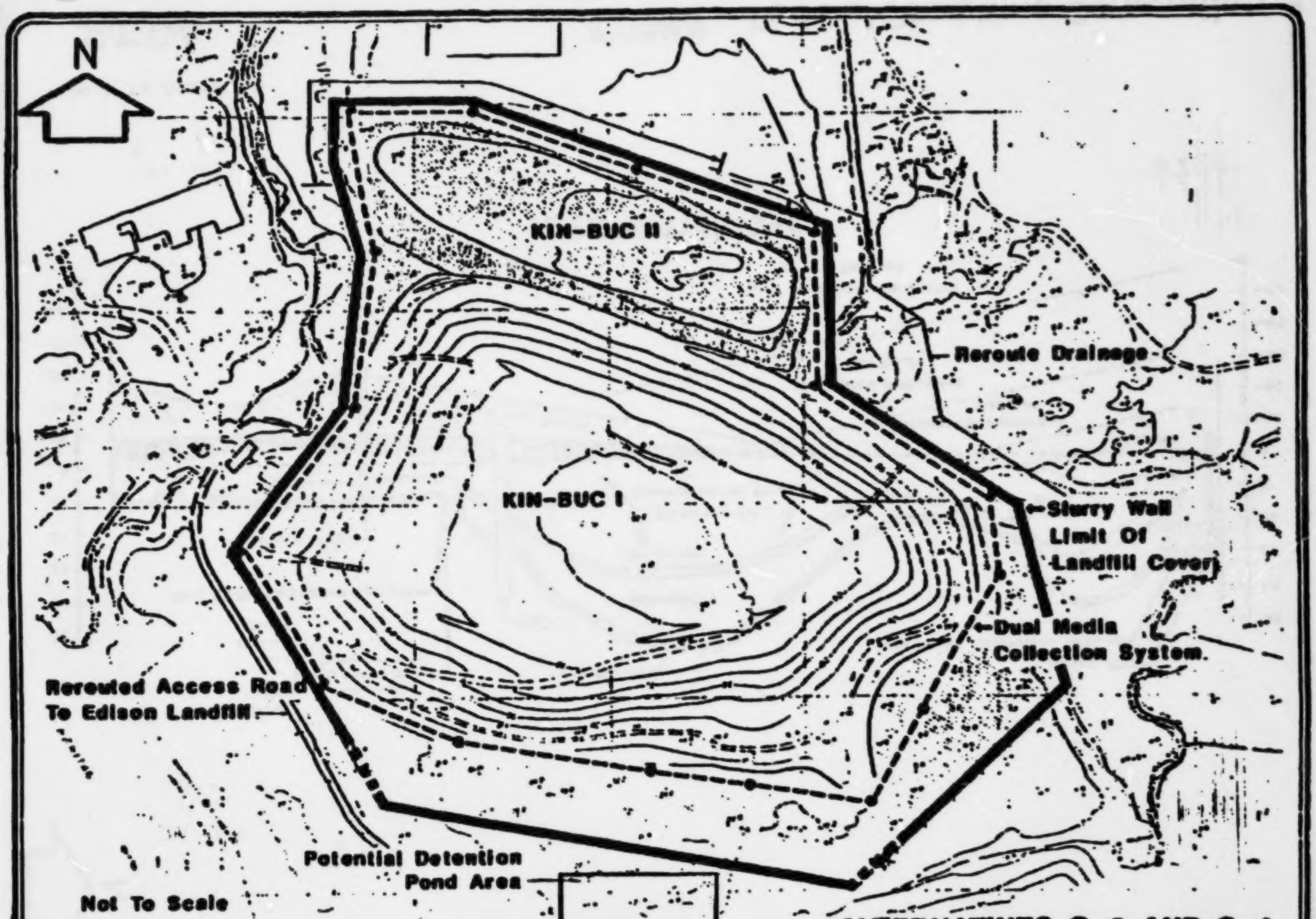
Alternative C4a-d would mitigate current and future use risks to public health and the environment. Use of on-site treatment of aqueous phase leachate and contaminated groundwater with dishcarge to surface water versus pre-treatment and discharge to the MCUA POTW is not expected to have a significant effect on community acceptance. The receiving body for the treated aqueous phase leachate and contaminated groundwater in either alternative is the Raritan River. Therefore, community acceptance is expected to be positive.

Alternatives C3a-d meet some of the site-specific source control objectives via installation of the cap, containment and collection system. There is reduction in the toxicity, mobility and volume of aqueous and oily phase leachate. Community acceptance of this is anticipated to be positive. Significant community concern is anticipated regarding the fact that contaminated groundwater in the sand and gravel aquifer and potentially, the bedrock aquifer, would not be addressed. Since the meadow marsh mat is not considered an effective barrier to prevent downward migration of contaminants, uncontrolled releases would continue. For these reasons, the overall acceptance of either alternative is not anticipated to be positive. Use of on-site treatment and discharge to surface water versus discharge to MCUA POTW is not expected to have a significant effect on community acceptance. The ultimate receiving body for treated aqueous phase leachate in either option is the Raritan River.

Alternative D -- Complete Excavation with Off-site Incineration

Community acceptance of this alternative is not anticipated to be positive due to significant community concern over the potential short-term risks to the environment and public health associated with this alternative.

FIGURE 5


N
KIN-BUC II
KIN-BUC I
Reroute Drainage
Slurry Wall
Limit Of Landfill Cover
Dual Media Collection System
Rerouted Access Road To Edison Landfill
Potential Detention Pond Area
Not To Scale

ALTERNATIVES C-3 AND C-4

EPA

CDM - Federal Programs Corporation

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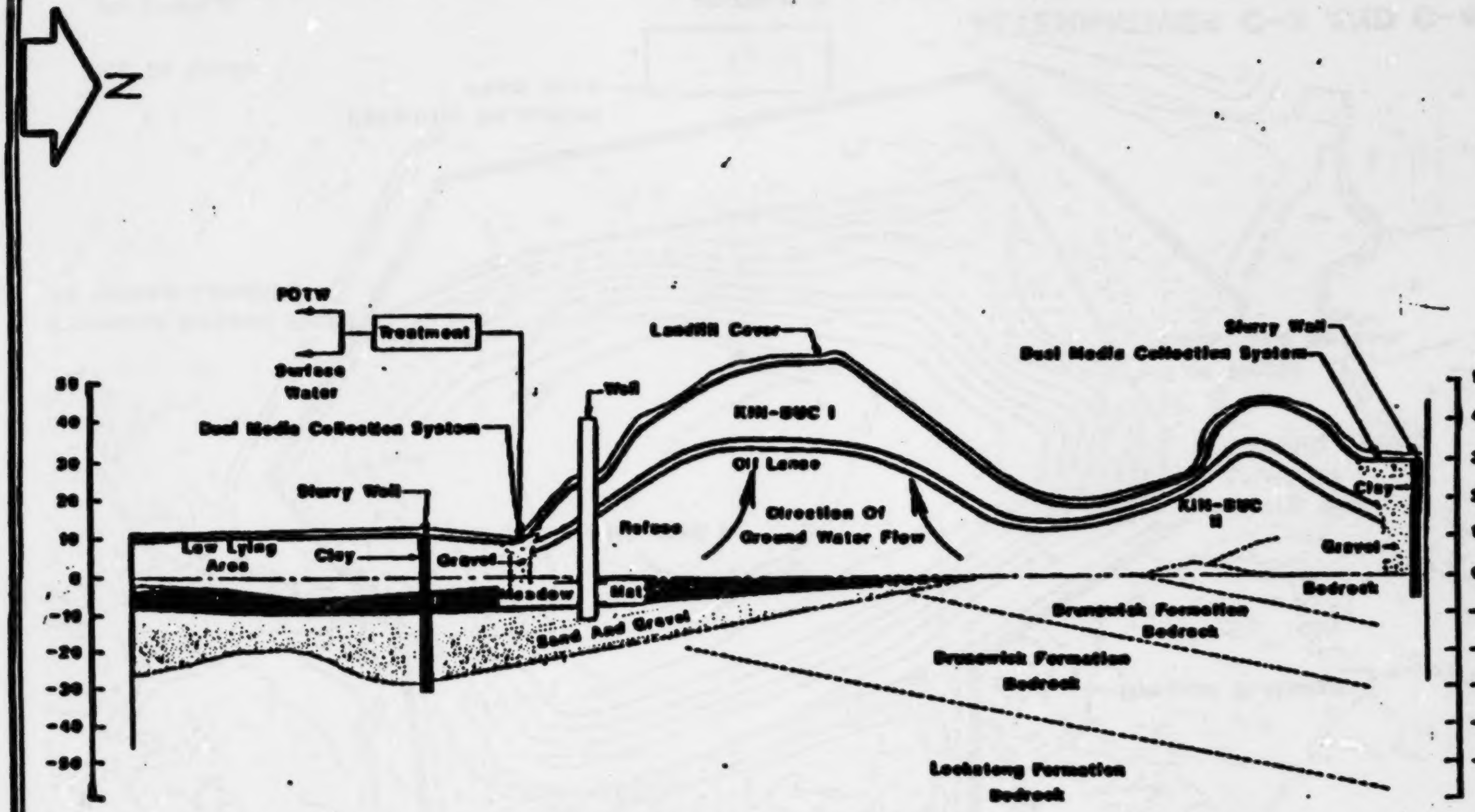
FIGURE 6



ALTERNATIVE C-4

Not To Scale

EPA

CDM - Federal Programs Corporation

-32-b

Alternative A -- No Further Action with Monitoring

Implementation of the No Further Action with Monitoring alternative would neither mitigate the public health and environmental risks nor provide adequate control of releases of hazardous substances to the environment. There has been significant community concern about this site over time. Therefore, it is anticipated that there would not be community acceptance of this alternative.

SELECTED REMEDY

A) Description of the Selected Remedy

1. Scope and Function of the Remedy

The selected remedy for the Kin-Buc Landfill - Operable Unit I is Alternative C4d. This alternative consists of the following components:

- circumferential slurry wall installation to bedrock on all of the sides of the site;
- maintenance, and upgrading if necessary, of the Kin-Buc I cap and installation of a cap in accordance with RCRA Subtitle C and State requirements on Kin-Buc II, portions of the low-lying area between Kin-Buc I and the Edison Landfill and Pool C;
- collection of oily phase and off-site incineration;
- collection and on-site treatment of aqueous phase leachate and contaminated groundwater with direct surface water discharge;
- periodic monitoring and
- operation and maintenance.

Figures 5 and 6 illustrate the components of the selected remedy.

Alternatively, The C4c alternative is acceptable if the MCUA POTW elects to accept pre-treated aqueous phase leachate and contaminated groundwater in accordance with their requirements.

2. Performance Goals

a. Management of Migration

The RI completed in April 1988, includes investigations of groundwater, surface water, sediments and air. The results of the RI indicate the potential for off-site public health and/or environmental impacts attributable to the Kin-Buc Landfill operations.

Based on the results of the RI; the magnitude and the complexity of the site warranted remediation of the site in discrete phases (Operable Units). The remediation of Operable Unit I, the subject of this ROD, constitutes source control, treatment and removal measures for the site.

The components of Operable Unit I are:

- Kin-Buc I;
- Kin-Buc II;
- Pool C and
- Low-Lying area between Kin-Buc I and the Edison Landfill.

Operable Unit II will address the management of migration measures that will be determined to be necessary at the site.

EPA has determined that a Supplemental Remedial Investigation will be required to adequately characterize the nature and extent of contamination from the components of Operable Unit II. Upon completion of the Supplement Remedial Investigation for Operable Unit II, an FS to develop and evaluate remedial alternatives will be conducted and the process will culminate in a subsequent ROD, which will document the selection of a remedy for management of migration of contaminants at the site. The process for selection of a remedy for Operable Unit II (Supplemental Remedial Investigation, FS, ROD) is expected to be completed in 1 and 1/2 to 2 years. Remedy selection for both Operable Units I and II is anticipated to result in total site remediation.

The components of Operable Unit II are comprised of the following:

- Mound B
- Raritan River
- Mill Brook
- Martins Creek
- Edmonds Creek, including the connecting channel from Pool C
- adjacent wetlands
- groundwater contamination emanating from the site

The rationale for addressing each of the aforementioned components as part of Operable Unit II is provided in Appendix 5.

b. Source Control

i. contaminated media and,
ii. type and volume of waste

The total quantity of waste disposed of at Kin-Buc Landfill has not been definitively determined. EPA estimates that at least 70 million gallons of liquid waste, including 3 million gallons of oily waste, and over 1 million tons of solid waste were disposed of between 1973 and 1976. The type of waste disposed at the site was previously discussed in the Site History section of the ROD. Refer to that section of the ROD for a detailed discussion.

In addition to the Kin-Buc I and II mounds, the low-lying area between Kin-Buc I and the Edison Landfill is also refuse filled. Oily-phase leachate contaminated with PCBs has been detected in monitoring wells installed in this area.

Pool C is the most significant and obvious manifestation of both oily and aqueous phase leachate. It is adjacent to Kin-Buc I which is its' primary source of contamination. Pool C is the source of PCB contamination found in the sediments of Edmonds Creek.

Groundwater in the sand and gravel aquifer beneath and downgradient of Kin-Buc I has been shown to be contaminated. Groundwater of the bedrock aquifer beneath the site could be potentially contaminated. The nature and extent of bedrock aquifer contamination is a component of Operable Unit II.

The selected remedy provides for collection and treatment of aqueous phase leachate, contaminated groundwater and oily phase leachate. A preliminary estimate of the volume of oily phase leachate to be collected and incinerated off-site is three million gallons. Preliminary estimates of the volume of aqueous phase leachate and contaminated groundwater in the sand and gravel aquifer is as follows:

Aqueous Phase Leachate (refuse layer)		Contaminated Groundwater (sand & gravel aquifer)	
Short-term (gpd)	Long-term (gpd)	Short-term (gpd)	Long-term (gpd)
10,000 (yrs. 1-4)	1,500 (yrs. 5+)	70,000 (yrs. 1-5)	50,000 (yrs. 6+)

Therefore, the preliminary estimates of the volume of aqueous phase leachate plus contaminated groundwater from the sand and gravel aquifer to be handled by the on-site treatment system is equal to 80,000 gpd (years 1-5) and 61,500 gpd (years 5+). The significant difference between the short-and long-term flows indicates the need for flexibility of operation in the treatment process ultimately utilized.

It should be emphasized that the flow values are preliminary estimates pending further treatability study work and additional subsurface investigations including evaluating the bedrock aquifer to determine its need for remediation. The conceptual treatment processes evaluated have been determined to be applicable for the aqueous phase leachate and contaminated groundwater. However, treatability study work on the various unit processes will be conducted and site specific discharge ARARS will be developed in conjunction with NJDEP to refine the operating parameters of the treatment system.

iii. treatment/residual levels

During development of the feasibility study, Federal and State ARARs as well as TBCs were evaluated for remediation of Operable Unit 1. Appendix 3 is a listing of Federal and State ARARs as well as TBCs for Operable Unit 1. A more detailed discussion of ARARs can be found in the subsequent portion of this document addressing consistency with other environmental laws.

The selected remedy entails collection and off-site incineration of oily-phase leachate. The oily-phase leachate has been shown, through sampling and analysis, to contain concentrations up to 5,822 ppm PCBs. Therefore, the incinerator utilized for the treatment of the oily-phase leachate must achieve a destruction and removal efficiency of 99.9999% according to RCRA Part 264, Subpart O, which discusses performance standards for incinerators.

Aqueous phase leachate and contaminated groundwater are to be collected, treated and discharged to surface water as part of the selected remedy. For purposes of the evaluation as part of the feasibility study, surface water quality criteria for an SE1 water (the surface water classification given to the Raritan River by the NJDEP) was utilized. These surface water quality criteria embodied in N.J.A.C. 7:9 - 4.1 et. seq. as well as wastewater discharge requirements provided in N.J.A.C. 7:9 - 5.1 et. seq. are the minimum treatment requirements for aqueous phase leachate and contaminated groundwater. Requirements of N.J.A.C. 7:9 - 4.1 et seq. and N.J.A.C. 7:9 - 5.1 et seq. are presented in Tables 3 and 4. Final site-specific discharge criteria will be established by NJDEP based on the results of treatability studies.

TABLE 3

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
7:9-4.14(c) Surface Water Quality Criteria for FW2, SE and SC Waters

(Expressed as maximum concentrations unless otherwise noted)

Substance	Criteria	Classifications
1. Bacterial quality (counts/100 ml)	i. Bacterial Indicators shall not exceed, in all shellfish waters, the standard for approved shellfish waters as established by the National Shellfish Sanitation Program as set forth in its current manual of operations.	Shellfish Waters
	ii. Fecal Coliforms:	
	(1) Fecal coliform levels shall not exceed exceed a geometric average of 200/100 ml nor should more than 10 percent of the total samples taken during and 30-day period ecceed 400/100 ml.	FW2 (except as in (3) below), SE1, and SC 1500 feet to 3 miles from the shoreline.
	iii. Samples shall be obtained at sufficient frequencies and at locations during periods which will permit valid interpretation of laboratory analyses. As a guideline and for the purpose fo these regualtions, a minimum of five samples taken over a 30-day period should be collected, however, the number of samples, frequencies and locations will be determined by the department or other appropriate agency in any particular case.	All Classifications

TABLE 3

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTICN
7:9-4.14(c) Surface Water Quality Criteria for FW2, SE and SC Waters

(Expressed as maximum concentrations unless otherwise noted)

Substance			
2. Dissolved oxygen (mg/l)	i.	24 hour average not less than 5.0, but not less than 4.0 at anytime (see paragraph viii below).	FW2-NT (except as in iv below), SE1
	viii.	Supersaturated dissolved oxygen values shall be expressed as their corresponding 100 percent saturation values for purposes of calculating 24 hour averages.	FW2-TM, FW2-NT, SE1
3. Floating, colloidal, color and settleable solids; petroleum hydrocarbons and other oils and grease	i.	None noticeable in the water or deposited along the shore or on the aquatic substata in quantities detrimental to the natural biota. None which would render the waters unsuitable for the designated uses.	All Classifications
	ii.	For "Petroleum Hydrocarbons" the goal is none detectable utilizing the Federal EPA Environmental Monitoring and Support Laboratory Method (Freon Extractable - Silica Gel Adsorption - Infrared Measurement); the present criteria, however, are those of paragraph i. above.	All Classifications
4. pH (Standard Units)	i.	6.5-8.5	FW2, All SE

TABLE 3

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION
7:9-4(c) Surface Water Quality Criteria for FW2, SE and SC Waters

(Expressed as maximum concentrations unless otherwise noted)

Substance	Criteria	Classifications
6. Radioactivity	i. Prevailing regulations adopted by EPA pursuant to Secs. 1412, 1445 & 1450 of the Public Health Services Act, as amended by the Safe Drinking Water Act (PL 93-523).	All Classifications
7. Solids, Suspended (mg/l] [Non-filterable residue]	iii. None which would render the waters unsuitable for the designated uses.	All SE, SC
8. Solids, Total Dissolved [Filterable Residue] (mg/l)	ii. None which would render the water unsuitable for the designated uses.	All SE

TABLE 4

STATE OF NEW JERSEY
DEPARTMENT OF ENVIRONMENTAL PROTECTION
NJAC 7:9-5.8 Minimum Treatment Requirements

These minimum treatment requirements apply to all discharges, where effluent limitations based upon water quality studies acceptable to the Department have not been developed and are required by N.J.A.C. 7:9-4.5(e)4 or 4.6(a).

Watershed	Classifications	BOD5 Removal*	BOD5 Maximum (mg/l)**	Discharge Type
Raritan River Basin (including Raritan Bay and Sandy Hook Bay)	SE1	85	--	All

* Minimum percent reduction of BOD5 at all times including any four-hour period of a day when the strength of the wastes to be treated might be expected to or actually exceeds average conditions.

** Average over any four-hour period of a day, including periods when the strength of the wastes to be treated might be expected to or actually exceeds average conditions.

TABLE 5

NEW JERSEY DEPARTMENT OF ENVIRONMENTAL PROTECTION QUALITY STANDARDS FOR LEACHATE DISCHARGED TO POTW

	Monthly Average	Daily Maximum
Total Toxic Organics*	2.13 mg/l	--
Total Toxic Volatile Organics	0.1 Lb/Hr	--
Benzene (I.9.1)		
Carbon tetrachloride (I.12.4)		
Chloroform (I.12.3)		
Dioxane		
Ethylenimine (aziridine)		
Ethylene bromide (I.12.30)		
Ethylene dichloride (I.12.7), 1,2-dichloroethane		
Tetrachloroethane (I.12.10)		
Tetrachloroethylene (I.12.26)		
1,1,2 trichloroethane (I.12.9)		
Trichloroethylene (I.12.23)		
Metals (ppb)		
Cyanide	650	1,200
As	1,000	3,000
Cd	260	690
Cr	120	230
Cn	360	1,100
Pb	400	600
Ni	170	360
Zn	660	2,200
Cr^{+6}	60	110
Ag	240	430
Hg	48	--

*No PCB's, pesticides, insecticides

Sludges generated by the on-site treatment system for aqueous phase leachate and contaminated groundwater will be dewatered. The dewatered sludges are anticipated to be considered hazardous and therefore land disposal in a RCRA subtitle C facility would be required. However, the dewatered sludges will be subject to treatability studies to determine the potential for further reduction in toxicity, mobility and volume as well as to determine the optimal treatment and/or disposal option that is in accordance with RCRA and in an environmentally sound manner.

Any discharge into the air from the treatment of aqueous phase leachate and contaminated groundwater will require meeting the substantive requirements of N.J.A.C. 7:27-8.2.

The C4c alternative, which is the same as C4d except that aqueous phase leachate and contaminated groundwater would be pre-treated on-site and discharged to the MCUA POTW for final treatment, is an acceptable alternative provided approval to discharge is granted by the MCUA POTW. The typical reported discharge standards for the MCUA facility are:

- Total petroleum hydrocarbons less than 100 ppm
- PCB concentrations less than 1 ppm
- No hazardous vapors
- pH 6-9
- Possible restricted discharge times

NJDEP has established quality standards for leachates being discharged to POTWs. In addition to the basic MCUA discharge standards, NJDEP regulates total toxic organics, total toxic volatile organics and specific metals. Table 5 summarizes these quality standards. Final site-specific pre-treatment criteria for discharge to the MCUA POTW would be based on results of treatability studies and established by NJDEP and the MCUA. Approval to discharge to the POTW would have to be granted by the MCUA. Sludges generated by this on-site pre-treatment system for aqueous phase leachate and contaminated groundwater would be handled in the same manner as described for the on-site treatment and surface water discharge alternative.

iv. estimated timeframe

Pre-design work including, but not limited to treatability studies and subsurface investigations are estimated to take 6 months to 1 year after the signing of the ROD. Design of the selected remedy is estimated to take 6 months to 1 year, but to a degree, can commence concurrently with pre-design work. The time required to construct the remedy is estimated to be 1 to 1 1/2 years. Therefore, the estimated timeframe for the selected remedy is 1 1/2 to 3 1/2 years.

B) STATUTORY DETERMINATIONS

1. Protectiveness

The selected remedy is protective of human health and the environment in that the source of groundwater contamination will be contained; thereby reducing lateral and vertical migration of aqueous phase leachate and contaminated groundwater. In addition, the collection and treatment of aqueous phase leachate and contaminated groundwater in the sand and gravel aquifer to meet surface water discharge criteria or alternatively criteria for discharge to the MCUA POTW will significantly reduce the toxicity and volume of contaminants in the groundwater and prevent further degradation of groundwater quality in the sand and gravel aquifer and potentially, the bedrock aquifer. The nature and extent of any bedrock aquifer contamination is a component of Operable Unit II. A determination of the need to remediate the bedrock aquifer will be made based on the RI/FS for Operable Unit II. However, the treatment system for Operable Unit I will be designed to consider the potential need to remediate groundwater in the bedrock aquifer.

The selected remedy mitigates the potential risk to public health by capping the Pool C environs (as well as Kin-Buc II and portions of the low-lying area between Kin-Buc I and the Edison Landfill); thereby preventing the uncontrolled release of contaminants to the air. Gas vents installed as part of the capping would be monitored in terms of the rate and composition of any airborne emissions and gases would be treated, if necessary. Meeting the substantive requirements of State air permits will be required for all landfill gas vents. In addition, the containment, collection and treatment of oily phase leachate (by off-site incineration) as well as aqueous phase leachate and contaminated groundwater (via onsite treatment and discharge to surface water or a POTW) reduces the mobility, toxicity and volume of contaminants which would be source of any air releases.

Workers who come in contact with oily phase leachate may be subject to a potential upperbound excess lifetime cancer risk that exceeds 10^{-6}, based on the concentration of PCBs in the leachate. This risk is primarily mitigated by the use of proper personal protection and strict adherence to health and safety protocols during any handling of oily phase leachate as part of the remedial action. Ultimately, collection and off-site incineration of oily phase leachate would remove the source of the potential risk to workers who would conduct long-term operation and maintenance at the site.

There is a potential risk from the consumption of aquatic life due to their bioaccumulation of PCBs. Estimates of the concentration of PCBs in the tissue of fish found in the Raritan River could be as high as 9 ppm, which exceeds the Food and Drug Administration limit of 2 ppm. Aquatic populations in the creeks adjacent to the site may be at risk due to chronic exposure to cadmium. The ongoing removal action has controlled the release of aqueous and oily phase leachate to the Raritan River and Edmonds Creek. The area had also been posted as a "No Fishing" area due to PCB contamination. The selected remedy will continue to control release of oily phase leachate as well as collect the material for off-site incineration. Removal and off-site incineration of oily phase leachate and collection and treatment of aqueous phase leachate and contaminated groundwater reduce the toxicity, mobility and volume of aqueous oily-phase leachate; thereby mitigating the risk to public health and the environment. During the Supplemental Remedial Investigation for Operable Unit II, impacts on surface water and sediments due to release of contaminants will be more fully evaluated.

Terrestrial populations, especially birds may be limited risk due to direct contact with leachate, predominately oily phase leachate. The capping of Pool C and its environs (the most overt manifestations of leachate) will preclude direct contact with leachate by terrestrial populations, especially birds; thereby mitigating the potential risk.

2. Consistency With Other Laws

During development of the feasibility study, applicable or relevant and appropriate requirements (ARARs) as well as TBCs were established for Operable Unit I site remediation based on current EPA guidance. Appendix 3 represents Federal and State ARARs and TBCs as well as their potential applicability to the selected remedy.

Applicable requirements are defined as those cleanup standards, standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under Federal or State law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location or other circumstance at a CERCLA site.

Relevant and appropriate requirements are defined as those cleanup standards of control, and other substantive environmental protection requirements, criteria, or limitations promulgated under Federal of State law that, while not "applicable" to a hazardous substance, pollutant, contaminant, remedial action, location or other circumstances at a CERCLA site, address problems or situations sufficiently similar to those encountered at the CERCLA site that their use is well suited to the particular site.

Non-promulgated advisories or guidance documents issued by Federal or State governments do not have the status of potential ARARs. However, they may be considered in determining the necessary level of cleanup for protection of public health and the environment.

There are several different types of requirements that Superfund actions may have to comply with. The classification of ARARs is presented below:

Location-specific requirements are restrictions on activities depending on the site or its immediate environs. As presented in Appendix 3, location specific requirements with regard to Kin-Buc Landfill-Operable Unit I pertain to portions of the site being within a 100-year floodplain and within a coastal zone. Location-specific ARAR requirements are expected to be met by the selected remedy.

Action-specific requirements set controls or restrictions on particular kinds of activities related to management of hazardous substances, pollutants or contaminants. These requirements are triggered by the remedial activities selected to accomplish a remedy. Action-specific requirements may specify particular performance levels, actions or technologies, as well as specific levels (or a methodology for setting specific levels) for discharged or residual chemicals. As presented in Appendix 3, action-specific Federal and State requirements as well as TBCs pertain predominately to requirements under RCRA and the Clean Water Act and are expected to be met.

Chemical-specific requirements are usually health or risk-based concentration limits or ranges in various environmental media for specific hazardous substances, pollutants or contaminants. These requirements can indicate an acceptable level of discharge (e.g. air emission or wastewater discharge taking into account water quality standards) where one occurs in a remedial activity. Aqueous phase leachate and contaminated groundwater are to be collected, treated and discharged to surface water as part of the selected remedy for Operable Unit I.

With respect to capping the Kin-Buc site, EPA has selected a remedy which requires maintenance, and upgrading if necessary, of the Kin-Buc I cap and installation of a cap in accordance with RCRA Subtitle C and State requirements on Kin-Buc II, portions of the low-lying area between Kin-Buc I and the Edison Lnadfill and Pool C.

However, NJDEP has utilized the RCRA guidance documents to develop design specifications for capping hazardous waste landfills and codified them into their hazardous waste landfill regulations. Therefore, cap design specifications contained in NJDEP's hazardous waste regulations are ARARs and must be met.

The existing cap design on Kin-Buc I was installed in 1980 as part of a partial stipulation under a Federal enforcement action. This cap meets performance criteria of RCRA Subtitle C requirements, assuming the integrity of the existing Kin-Buc I cap is verified during the Supplemental Remedial Investigation for Operable Unit II. For this reason, EPA does not believe that application of the State requirements to the Kin-Buc I cap is appropriate at this time. The continued maintenance, and upgrading if necessary, for the Kin-Buc I cap is the selected capping remedy for Kin-Buc I. However, Kin-Buc II, portions of the low-lying area between Kin-Buc I and the Edison Landfill and Pool C must be capped in accordance with RCRA Subtitle and State requirements.

For purposes of the evaluation of alternatives in the feasibility study, surface water quality criteria for an SE1 water (the surface water classification given to the Raritan River by NJDEP) was utilized. These surface water quality criteria provided in N.J.A.C. 7:9-4.1 et seq. as well as waste water discharge requirements proved in N.J.A.C. 7:9-5.1 et seq. are the minimum treatment requirements for aqueous phase leachate and contaminatd groundwater (see Tables 3 and 4 which present surface water quality criteria and wastewater discharge requirements respectively). Final site-specific discharge ARARs will be established by NJDEP based on treatability studies and are expected to be met by the selected remedy.

In the event that MCUA grants approval to discharge to their POTW, the quality standards for leachates being discharged to POTWs established by NJDEP in addition to MCUA's basic discharge standards would be the minimum requirements pending final site-specific pre-treatment criteria. Site-specific pre-treatment criteria for discharge to the MCUA POTW would be based on the results of treatability studies and established by NJDEP and the MCUA and are expected to be met by the selected remedy.

Finally, Title 7, Chapter 27, Subchapter 8 of the New Jersey Administrative Code describes general provisions required for landfill vents. The substantive requirements for air permits for landfill gas vents would be met. Upon installation of gas vents as part of the remedy, the rate and compositions of any volatile organic compounds emitted would be evaluated to determine the need for any chemical-specific requirements. The selected remedy is expected to meet those requirements.

3. Cost-Effectiveness

After careful consideration of all reasonable alternatives, EPA selected Alternative C4d for the remediation of Kin-Buc Landfill-Operable Unit I. However, the C4c alternative, which is the same as C4d except for on-site aqueous phase leachate and contaminated groundwater pre-treatment with discharge to the MCUA POTW is an acceptable alternative which can be implemented should approval to discharge be obtained from the MCUA. The selected remedy was determined to provide the greatest overall effectiveness proportionate to its costs.

4. Utilization of Permanent Solutions and Alternative Treatment Technologies to the Maximum Extent Practicable

This section provides the overall rationale for remedy selection, that is, how the remedy was judged to provide the best balance of trade-offs among the alternatives examined in detail. It also discusses the alternatives' utilization of permanent solutions and treatment to the maximum extent practicable.

Alternative A - No Further Action With Monitoring

This alternative was eliminated since no further action would allow for the continued uncontrolled release of hazardous substances into the environment, would not mitigate the potential public health and environmental risks posed by the site and would not provide control or adequate removal of the source of contamination. Therefore, this alternative would not utilize permanent solutions or treatment to the maximum extent practicable.

Alternatives C3a-d -- slurry wall installation to bedrock in the northern portion of the site and to the meadow marsh mat in the southern portion of the site, collection of oily-phase leachate for off-site incineration, collection and treatment of aqueous phase leachate, capping, periodic monitoring, operation & maintenance

These alternatives were eliminated because slurry wall installation to the meadow marsh mat in the southern portion of the site would not provide adequate source control. Contaminants would continue to be released to the sand and gravel aquifer; contaminated groundwater would not be collected or treated as part of these alternatives to the degree necessary. Hence, the potential for downward migration of contaminants into the bedrock aquifer and lateral migration of contaminants into the surrounding environment, including adjacent surface waters, would not be controlled. Additionally, Alternatives C3a and C3b do not provide for a cap on Kin-Buc II, Pool C and the low-lying area between Kin-Buc I and the Edison Landfill which would be in compliance with ARARs.

Therefore, uncontrolled releases of hazardous substances into the environment would occur, compliance with ARARs would not be achieved, there would not be utilization of permanent solutions and treatment to the maximum extent practicable. and the potential public health and environmental risks posed by the site may not be adequately mitigated.

Alternatives C4a and C4b - slurry wall installation to bedrock on all sides, collection of oily-phase leachate for off-site incineration, collection and treatment of aqueous-phase leachate and groundwater, existing cap design on Kin-Buc I extended to Kin-Buc II, portions of the low-lying area between Kin-Buc I and the Edison Landfill and Pool C, periodic monitoring, operation & maintenance

These two alternatives were eliminated, because the cap would not be in compliance with ARARs.

Alternative D - Complete Waste Excavation for Off-Site Incineration

Utilization of permanent solutions and treatment would be to the maximum extent practicable. However, this alternative was eliminated because of the significant short-term risks posed to workers who would be remediating the site and nearby residents during implementation of this alternative. In addition, there are significant technical complexities (e.g. on-site space constraints, sequencing of operators) associated with a waste excavation of this magnitude.

If a single incinerator was capable or dedicating itself to the destruction of Kin-Buc wastes (unlikely), there does not appear to be an incinerator in the country that is large enough to handle the disposal of wastes from Kin-Buc within a reasonable time period. If the largest incinerator were capable of dedicating itself to incinerating Kin-Buc wastes, it is estimated that may take at least 35 years to complete incineration of the excavated wastes from the site.

5. Preference for Treatment as a Principal Element

The selected remedy satifies the statutory preference for treatment as a principal element for remediation of the source of contamination.

To date, approximately 26,000 gallons of oily-phase leachate has been collected and incinerated off-site via a passive system. Oily-phase leachate, containing PCBs, will be actively collected and incinerated off-site. Containment, capping, active collection and treatment by off-site incineration of this material will significantly reduce its toxicity, mobility and volume. The public health threat that the continued release of oily-phase leachate poses via potential exposure through direct contact, bioaccumulation or air and the environmental threat posed via potential exposure through direct contact to animal and/or bird populations, bioaccumulation, surface water as well as continued degradation of the surrounding wetlands is mitigated. Contamination that has migrated beyond the source control area determined for Operable Unit I will be addressed in Operable Unit II.

To date, approximately 1.4 million gallons of aqueous phase leachate has been collected utilizing a passive collection system. Aqueous-phase leachate and contaminated groundwater will be actively collected and treated on-site for discharge to surface water (or alternatively, pre-treated and discharged to the MCUA POTW). Containment, active collection and treatment (whether entirely on-site or by the POTW) of this material will result in a significant reduction in its toxicity, mobility and volume. The potential public health and/or environmental threats posed by the continued release and aqueous-phase leachate and potential exposure through groundwater, surface water, air and direct contact will be mitigated.

The selected remedy was determined to be the most appropriate solution for the site. It represents the best combination of the remedial evaluation criteria to achieve a preference for treatment to the maximum extent practicable. Alternative C4d best addresses public health and environmental concerns, compliance with ARARs, technical performance and cost-effectiveness.

APPENDIX 1

Kin-Buc Ground-Water Monitoring Wells Screened In Sand and Gravel[a]

Sheet 1 of 3

Element/Compound	Frequency of Detection	Minimum (ppm)	Maximum (ppm)	Geometric Mean[b] (ppm)
Ammonium Nitrogen	16/16	0.39	122.6	7.38
BOD	10/10	1.00	1,106.0	106.0
COD	12/12	1.00	727.0	340.0
Chloride	13/13	60.5	4,750.0	1853.8
Cyanide (total)	27/27	<0.001[c]	0.5	0.012
Dissolved Solids	16/16	140	10,360.0	4928.0
Fluoride	1/1	2.10	2.10	2.10
Kjeldahl Nitrogen	4/4	13.3	96.50	39.2
Nitrate	13/13	0.07	2.43	0.37
Oil & Grease	9/9	<1.0	5.0	3.2
Organic Nitrogen	13/13	<0.1	23.4	3.1
Sulfate	8/8	36.2	300.0	169.0
Suspended Solids	5/5	67.0	7,640.0	822.0
TOC	17/17	1.7	1,100.0	75.9
Aluminum	13/13	0.064	21.6	0.977
Antimony	17/24	ND	2.0	0.093
Arsenic	33/34	ND	0.22	0.018
Barium	17/17	0.1	5.40	0.767
Beryllium	17/24	ND	0.026	0.006
Cadmium	26/29	ND	0.02	0.008
Chromium	24/34	ND	0.640	0.022
Cobalt	5/8	ND	0.073	0.031
Copper	23/34	ND	0.58	0.039
Iron	15/15	<0.1	582.0	10.740
Lead	35/45	ND	2.7	0.021
Manganese	14/14	0.470	13.5	1.489
Mercury	17/24	ND	0.0132	0.0004
Nickel	24/29	ND	0.48	0.093
Selenium	18/29	ND	0.021	0.005
Silver	14/20	ND	0.029	0.009
Thallium	20/29	ND	0.2	0.016
Tin	4/8	ND	0.083	0.041
Vanadium	3/8	ND	0.08	0.050
Zinc	45/45	0.01	137.0	0.506

APPENDIX 1

Kin-Buc Ground-Water Monitoring Wells
Screened In Sand and Gravel[a]
Sheet 1 of 3

Element/Compound	Frequency of Detection	Minimum (ppm)	Maximum (ppm)	Geometric Mean[b] (ppm)
Ammonium Nitrogen	16/16	0.39	122.6	7.38
BOD	10/10	1.00	1,106.0	106.0
COD	12/12	1.00	727.0	340.0
Chloride	13/13	60.5	4,750.0	1853.8
Cyanide (total)	27/27	<0.001[c]	0.5	0.012
Dissolved Solids	16/16	140	10,360.0	4928.0
Fluoride	1/1	2.10	2.10	2.10
Kjeldahl Nitrogen	4/4	13.3	96.50	39.2
Nitrate	13/13	0.07	2.43	0.37
Oil & Grease	9/9	<1.0	5.0	3.2
Organic Nitrogen	13/13	<0.1	23.4	3.1
Sulfate	8/8	36.2	300.0	169.0
Suspended Solids	5/5	67.0	7,640.0	822.0
TOC	17/17	1.7	1,100.0	75.9
Aluminum	13/13	0.064	21.6	0.977
Antimony	17/24	ND	2.0	0.093
Arsenic	33/34	ND	0.22	0.018
Barium	17/17	0.1	5.40	0.767
Beryllium	17/24	ND	0.026	0.006
Cadmium	26/29	ND	0.02	0.008
Chromium	24/34	ND	0.640	0.022
Cobalt	5/8	ND	0.073	0.031
Copper	23/34	ND	0.58	0.039
Iron	15/15	<0.1	582.0	10.740
Lead	35/45	ND	2.7	0.021
Manganese	14/14	0.470	13.5	1.489
Mercury	17/24	ND	0.0132	0.0004
Nickel	24/29	ND	0.48	0.093
Selenium	18/29	ND	0.021	0.005
Silver	14/20	ND	0.029	0.009
Thallium	20/29	ND	0.2	0.016
Tin	4/8	ND	0.083	0.041
Vanadium	3/8	ND	0.08	0.050
Zinc	45/45	0.01	137.0	0.506

— APPENDIX 1

Analytical Results From Kin-Buc Ground-Water Monitoring Wells Screened In Sand and Gravel[a]

Sheet 2 of 3

Element/Compound	Frequency of Detection	Minimum (ppm)	Maximum (ppm)	Geometric Mean[b] (ppm)
Acetone	2/34	ND	840.0	0.015
Benzene	40/78	ND	21.0	0.015
Benzoic Acid	1/33	ND	0.2	0.057
Bis (2-chloroethyl) ether	1/49	ND	0.005	0.010
Bis (2-ethylhexyl) phthalate	18/54	ND	3.40	0.021
Bromodichloromethane	1/44	ND	0.033	0.005
2-Butanone	1/33	ND	340.0	0.014
Butyl benzyl phthalate	6/53	ND	0.058	0.011
Chlorobenzene	23/74	ND	12.6	0.009
Chloroethane	10/73	ND	0.111	0.011
Chloroform	7/52	ND	0.170	0.005
p-Chloro-m-cresol	2/44	ND	0.01	0.010
4,4-DDD	1/55	ND	<0.01	0.0001
1,2-Dichlorobenzene	3/57	ND	0.085	0.010
1,1-Dichloroethane	8/74	ND	0.071	0.006
1,2-Dichloroethane	5/74	ND	0.660	0.006
1,1-Dichloroethene	4/52	ND	0.016	0.005
Diethyl phthalate	8/55	ND	0.340	0.010
2,4-Dimethyl phenol	1/4	ND	0.015	0.01
Di-n-butyl phthalate	20/54	ND	0.170	0.010
Di-n-octyl phthalate	15/53	ND	0.018	0.010
Ethylbenzene	20/72	ND	2.80	0.010
Methylene chloride	30/71	ND	0.370	0.010
4-Methyl-2-pentanone	1/28	ND	98.0	0.010
Naphthalene	5/57	ND	0.210	0.010
n-Nitrosodiphenylamine	1/47	ND	0.0053	0.010
PCB: Total	1/4	ND	0.116	0.002

APPENDIX 1

Analytical Results From
Kin-Buc Ground-Water Monitoring Wells
Screened In Sand and Gravel[a]

Sheet 3 of 3

Element/Compound	Frequency of Detection	Minimum (ppm)	Maximum (ppm)	Geometric Mean[b] (ppm)
Phenols (total)	31/40	ND	103	0.040
Tetrachloroethene	19/80	ND	1.80	0.009
Toluene	34/77	ND	42.0	0.008
trans-1,2-dichloroethene	14/71	ND	5.40	0.007
1,1,1-Trichloroethane	1/56	ND	0.56	0.005
Trichloroethene	10/78	ND	2.0	0.007
Vinyl chloride	6/74	ND	0.19	0.010
Xylene	10/23	ND	0.016	0.005
o-Xylene	4/29	ND	1.60	0.007

Notes: Data compiled from sources listed in Appendix B

ND = Not detected

[a] The wells included in this summary are those of the KINWT, GEI, (except wells 9R and 12WR) and NJDEP (Wells 5 and 6) series.

[b] Section 1.3.2 describes the procedures used to calculate the geometric means.

[c] Detected at concentrations less than the detection limit

Screened in Bedrock/Brunswick Shale
Upgradient and Downgradient Ground-Water Analysis
Sheet 1 of 2

Element/Compound	Upgradient Wells[a]				Downgradient Wells[b]			
	Frequency of Detection	Minimum (ppm)	Maximum (ppm)	Mean (ppm)	Frequency of Detection	Minimum (ppm)	Maximum (ppm)	Mean (ppm)
BOD	7/7	1	31	7.0	5/5	1	35	3.0
COD	10/10	2.8	65	7.0	6/6	1	430	22.0
Chloride	9/9	0.9	14	4.0	5/5	7.4	23	11.3
Cyanide (total)	4/4	0.005	<0.01[c]	0.005	4/4	<0.005[c]	0.040	0.06
Dissolved Solid	8/8	84	170	136.0	5/5	212	315	256.0
Fluoride	1/1	0.3	0.3	0.3	0/0	d	d	--
Nitrate	4/4	0.1	0.27	0.16	3/3	0.08	0.35	0.21
Sulfate	4/4	11	28	17.0	3/3	10	116	47.0
TOC	2/2	1.7	4.7	2.8	1/1	4.4	4.4	4.4
Aluminum	2/2	0.112	0.650	0.270	1/1	0.310	0.310	0.310
Antimony	2/4	ND	<0.20	0.060	1/2	ND	<0.200	0.060
Arsenic	7/8	ND	0.013	0.008	7/7	0.002	0.015	0.008
Barium	3/4	ND	0.15	0.156	3/3	0.150	0.200	0.170
Beryllium	3/4	ND	0.0014	0.004	1/2	ND	<0.02	0.005
Cadmium	7/8	ND	0.01	0.006	5/5	<0.01	0.062	0.011
Chromium	6/8	ND	0.01	0.010	5/7	ND	<0.02	0.008
Cobalt	0/2	ND	ND	--	1/1	0.011	0.011	0.011
Copper	6/8	ND	0.035	0.026	4/7	ND	0.090	0.036
Iron	10/10	0.20	15.5	1.930	6/6	0.026	86.0	3.1

Kin-Buc Ground-Water Monitoring Wells
Screened in Bedrock/Brunswick Shale
Upgradient and Downgradient Analysis
Sheet 2 of 2

Element/Compound	Upgradient Wells[a]				Downgradient Wells[b]			
	Frequency of Detection	Minimum (ppm)	Maximum (ppm)	Mean (ppm)	Frequency of Detection	Minimum (ppm)	Maximum (ppm)	Mean (ppm)
Lead	8/8	0.007	0.070	0.015	5/7	ND	0.210	0.14
Manganese	6/6	0.1	0.4	0.100	3/3	0.2	2.74	0.60
Mercury	2/4	ND	<0.0005	0.0002	1/2	ND	0.0017	0.0006
Nickel	4/4	<0.02	0.170	0.054	3/4	ND	0.150	0.042
Selenium	6/8	ND	<0.020	0.005	6/7	ND	0.0089	0.005
Silver	4/6	ND	0.025	0.014	3/4	ND	0.05	0.019
Thallium	2/4	ND	<0.20	0.010	4/5	ND	0.28	0.028
Tin	0/2	ND	ND	--	1/1	0.012	0.012	0.012
Vanadium	1/2	ND	0.050	0.050	0/1	ND	ND	--
Zinc	8/8	<0.05	0.250	0.086	7/7	<0.04	0.25	0.120
Benzene	0/4	ND	ND	--	1/5	ND	<0.010[c]	0.005
Chloroethane	0/4	ND	ND	--	1/5	ND	<0.010	0.010
1,1-Dichloroethane	0/4	ND	ND	--	2/5	ND	0.078	0.009
Ethyl benzene	0/4	ND	ND	--	1/5	ND	<0.010	0.005
Methylene chloride	1/4	ND	1.3	0.020	3/5	ND	0.041	0.010
Phenols (total)	8/10	ND	0.0074	0.004	7/9	ND	2.43	0.010
Tetrachloroethene	0/2	ND	ND	--	2/5	ND	<0.010	0.005
Toluene	0/4	ND	ND	--	2/5	ND	<0.005	0.005
Trichloroethene	0/4	ND	ND	--	1/5	ND	<0.010	0.005

Notes:

Data compiled from sources listed in Appendix B
ND = Not detected
-- = Unable to calculate
a Upgradient wells screened in bedrock are MW-1 and MW-2
b Downgradient wells screened in bedrock are MW-3, MW-4, MW-5, GEI-9R, and GEI-12AR
c Detected at concentrations less than the method detection limit
d Test not performed

APPENDIX 3
LOCATION SPECIFIC FEDERAL ARARS AND CRITERIA, ADVISORIES & GUIDANCES TO BE CONSIDERED
KIN-BUC FEASIBILITY STUDY

LOCATION	REQUIREMENT	Prerequisite(s)	Citation	Potential Applicability
Within 100-year floodplain	Facility must be designed, constructed, operated, and maintained to avoid washout	RCRA hazardous waste; treatment, storage, or disposal	40 CFR 264.18(b)	"Relevant and Appropriate" Alternatives, C3,, C4 and and D, as it pertains to portions of the site which may be within the 100-year floodplain.
Within floodplain	Action to avoid adverse effects, minimize potential harm, restore and preserve natural and beneficial values	Action that will occur in a floodplain, i.e., lowlands, and relatively flat areas adjoining inland and coastal waters and other flood prone areas	Executive Order 11988, Protection of Floodplains, (40 CFR 6, Appendix A)	"Applicable" to Alternatives C3, C4 and D as it pertains to portions of the site which may be within floodplains.
Within coastal zone	Conduct activities in manner consistent with approved State management programs	Activities affecting the coastal zone including lands thereunder and adjacent shorelands	Coastal Zone Management Act (16.U.S.C. Section 1451 et seq.)	"Applicable" to Alternatives C3, C4 and D.

APPENDIX 3
ACTION SPECIF EDERAL ARARSS
AND CRITERIA, ADVISORIES & GUIDANCES TO BE CONSIDERED
KIN-BUC FEASIBILTY STUDY

Action	Requirement	Prerequisite(s)	Citation	Potential Applicability
Air Stripping	Proposed standards for control of emmissions of volatile organics.	Proposed standard, to be considered	52 FR 3748 (February 5, 1987)	Proposed standard, not yet a ARAR but may be "applicable" in the future to Alternative C3 and C4 as it pertains to possible on-site aqueous air stripping pretreatment prior to off-site disposal.
Capping	Placement of a cap over waste (e.g., closing a landfill, or closing a surface impoundment or waste pile as a landfill, or similar action) requires a cover designed and constructed to: • Provide long-term minimization migration of liquids through the capped area • Function with minimum maintenance • Promote drainage and minimize erosion or abrasion of the cover • Accommodate settling and subsidence so that the cover's integrity is maintained • Have a permeability less than or equal to the permeability of any bottom liner system or natural subsoils present.	Disturbance of hazardous waste and movement of it outside the unit or area of contamination will make requirements applicable; capping without disturbance will not make requirements applicable, but technical requirements are likely to be relevant and appropriate.	40 CFR 264.301(a) (Landfills) 40 CFR 264.117(c) (Closure and Post-Closure)	"Relevant and Appropriate" to Alternatives C3 and C4.
	Restrict post-closure use of property as necessary to prevent damage to the cover.		40 CFR 264.310(b)	
	Prevent run-on and run-off from damaging cover.			
	Protect and maintain surveyed benchmarks used to locate waste cells (landfills, waste piles).			

ACTION SPECIFIC FEDERAL ARARS
AND CRITERIA, ADVISORIES & GUIDANCES TO BE CONSIDERED
KIN-BUC FEASIBILITY STUDY

Action	Requirement	Prerequisite(s)	Citation	Potential Applicability
Consolidation	Area from which materials are removed should be cleaned up.	Disposal by disturbance of hazardous waste (listed or characteristic) ad moving it outside unit or boundary of contaminated area.	See closure	"Applicable" to Alternative D if it is necessary for any reason to construct waste piles/storage tanks, etc. on-site to contain excavated wastes prior to off-site disposal.
	Consolidation in storage piles/storage tanks will trigger storage requirements		See Container Storage, Tank Storage, Waste Piles in this Exhibit.	
Container Storage (On-Site)	Containers of hazardous waste must be: • Maintained in good condition • Compatible with hazardous waste to be stored; and • Closed during storage (except to add or remove waste).	RCRA waste (listed or characteristic, held for a temporary period before treatment, disposal, or storage elsewhere, (40 CFR 264.10) in a container (i.e., any portable device in which a material is stored transported, disposed of, or handled (40 CFR 264.10)	All citations pertain to use and management of containers. 40 CFR 264.172 40 CFR	Applicable to Alternative D as it pertains to the used and management of containers used for excavated waste.
	Inspect container storage areas weekly for deterioration.		40 CFR 264.174	
	Place containers on a sloped, crack-free base, and protect from contact with accumulated liquid. Provide containment system with a capacity of 10% of the volume of containers of free liquids. Remove spilled or leaked waste in a timely manner to prevent overflow of the containment system.		40 CFR 264.175	
	Keep containers of ignitable or reactive waste at least 50 feet from the facility's property line.		40 CFR 264.176	
	Keep incompatible materials separate. Separate incompatible materials stored near each other by a dike or other barrier.		40 CFR 264.177	

APPENDIX 3
ACTION SPECIFIC FEDERAL ARARS
AND CRITERIA, ADVISORIES UIDANCES TO BE CONSIDERED
KIN-BUC FEASIBILITY STUDY

Action	Requirement	Prerequisite(s)	Citation	Potential Applicability
Clean Closure Removal)	General performance standard requires minimization of need for further maintenance and control; minimization or elimination of post-closure escape of hazardous waste, hazardous constituents, leachate, contaminated runoff, or hazardous waste decomposition products. Disposal or decontamination of equipment, structures, and soils.	Disturbance of RCRA hazardous waste (listed or characteristic) placed at site after November 19, 1980 and movement outside the unit or area of contamination. May apply to surface impoundment; contaminated soil, including soil from dredging or soil disturbed in the course of drilling, or excavation, and returned to land.	40 CFRA 264.111 (Closure and Post-Closure Performance Standard)	"Relevant and Appropriate" to Alternative D.
	Removal or decontamination of all waste residues, contaminated containment system components (e.g. liners, dikes), contaminated subsoils, and structures and equipment contaminated with waste and leachate, and management of them as hazardous waste.	Not applicable to undisturbed material.	40 CFR 264.228 (a)(1) (Surface impoundments-Closure and Post-Closure Care), and 40 CFR 264.258 (Waste Piles-Closure and Post-Closure Care)	"Applicable" to Alternative D if it is necessary for any reason to construct a surface impoundment or waste pile on-site to contain excavated wastes prior to off-site disposal, and "Applicable" to Alternatives C3 and C4 if a surface impoundment is constructed on-site as part of aqueous pretreatment prior to off-site disposal.
	Meet health-based levels at unit.	Disposal of RCRA hazardous waste (listed or characteristic) placed at site after November 19, 1980 after disturbance and movement outside the unit or area of contamination.	40 CFR 264.111	"Relevant and Appropriate" to Alternative D.

ACTION SPECIFIC FEDERAL ARARS
AND CRITERIA, ADVISORIES & GUIDANCES TO BE CONSIDERED
KIN-BUC FEASIBILITY STUDY

Action	Requirements	Prerequisite(s)	Citation	Potential Applicability
Closure with Waste in Place (Capping)	Installation of final cover to provide long-term minimization of infiltration. Post-closure care and groundwater monitoring.	Prerequisite same as for capping.	40 CFR 264.310 (Landfills)	"Relevant and Appropriate" to Alternatives and C3 and C4.
Closure with Waste in Place (Hybrid Closure)	Removal of majority of contaminated materials. Application of cover and post-closure monitoring based on exposure pathway(s) of concern.	Proposed rule, to be considered.	52 FR 8712 (March 19, 1987)	"Relevant and Appropriate" to Alternative D if for some reason a portion fo the contaminated waste/soils are left in place (i.e., not excavated and removed).
Dike Stabilization	Design and operate facility to prevent overtopping due to overfilling; wind and wave action; rainfall; run-on; malfunctions of level controllers, alarms, and other equipment; and human error. Construct dikes with sufficient strength to prevent massive failure.	Existing surface impoundment containing hazardous waste, or creation of new surface impoundment.	40 CFR 264.221 (Surface impoundment)	"Applicable" to Alternatives C3 and C4 if a surface impoundment is constructed on-site as part of aqueous pretreatment prior to off-site disposal. Also "Applicable" to Alternative D if it is necessary for any reason to construct a surface impoundment on-site to contain excavated wastes prior to off-site disposal.
	Inspect liners and cover systems during and after construction.		40 CFR 264.226 (Surface impoundment)	
	Inspect weekly for proper operation and integrity of the containment devices.		40 CFR 264.226	
	Remove surface impoundment from operation if the dike leaks or there is a sudden drop in liquid levels.		40 CFR 264.227 (Surface impoundment)	
	At closure, remove or decontaminate all waste residues and contaminated materials. Otherwise, free liquids must be removed, the remaining wastes stabilized, and the facility closed in the same manner as a landfill.		40 CFR 264.228 (Surface impoundment)	
	Manage ignitable or reactive wastes so that it is protected from materials or conditions that may cause it to ignite or react.		40 CFR 264.227	

ACTION SPECIFIC FEDERAL ARARS
AND CRITERIA, ADVISORIES & GUIDANCES TO BE COSIDERED
KIN-BUC FE ILITY STUDY

Action	Requirement	Prerequisite(s)	Citation	Potential Applicability
Direct discharge of treatment system effluent	Use of best available technology (BAT) economically achievable is required to control toxic and nonconventional pollutants. Use of best conventional pollutants control technology (BCT) is required to control conventional pollutants. Technology-based limitations may be determined on a case-by-case basis.		40 CFR 122.44(a)	"Applicable" to Alternatives C3 and C4 as it pertains to possible on-site treatment with direct surface water discharge.
	Applicable Federally approved State water quality standards must be complied with. These standards may be in addition to or more stringent than other Federal standards under the CWA.		40 CFR 122.44 and State regulations approved under 40 CFR 131	
	Applicable Federal water quality criteria for the protection of aquatic life must be complied with when environmental factors are being considered.		40 CFR 122.44(d)	
	The discharge must conform to applicable water quality requirements when the discharge affects state other than the certifying state.			
	The discharge must be consistent with the requirements of a Water Quality Management plan approved by EPA water (WA §208(6)).			
	Discharge limitations must be established for all toxic pollutants that are or may be discharged at levels greater than that which can be achieved by technology-based standards.		40 CFR 122.44(e)	
	Develop and implement a BMP program and incorporate in the NPDES permit to prevent the release of toxic constituents to surface waters.		40 CFR 125.100	

APPENDIX 3
ACTIONS SPECIFIC FEDERAL ARARS
AND CRITERIA ADVISORIES & GUIDANCE TO CONSIDERED

on	Requirement	Prerequisite(s)	Citation	Potential Applicability
	The BMP Program must: • Establish specific procedures for the control of toxic and hazardous pollutant spills • Include a prediction of direction, rate of flow, and total quantity of toxic pollutants where experience indicates a reasonable potential for equipment failure. • Assure proper management of solid and hazardous waste in accordance with regulations promulgated under RCRA.		40 CFR 125.104	
	Discharge must be monitored to assure compliance. Discharge will monitor: • The mass of each pollutant • The volume of effluent • Frequency of discharge and other measurements as appropriate		40 CFR 122.44(i)	
	Approved test methods for waste constituents to be monitored must be followed. Detailed requirements for analytical procedures and quality controls are provided. Sample preservation procedures, container materials, and maximum allowable holding times are prescribed.		40 CFR 136.1 - 136.4	
	Permit application information must be submitted including a description of activities, listings of environmental permits, etc.	On site discharge surface waters must meet substantive NPDES permit requirements.	40 CFR 122.21	
	Monitor and report results as required by permit (minimum of at least annually)		40 CFR 122.44(i)	

APPENDIX 3
ACTION SPEC FEDERAL ARARS
AND CRITERIA, ADVISORIES & GUIDANCES TO BE CONSIDERED
KIN-BUC FEASIBILITY STUDY

Action	Requirements	Prerequisite(s)	Citation	Potential Applicability
	Comply with additional permit conditions such as: • Duty to mitigate any adverse effects of any; discharge; and • Proper operation and maintenance of treatment systems.		40 CFR 122.41(1)	
Discharge to POTW[a]	Pollutants that pass through the POTW without treatment, interfere with POTW operation, or contaminate POTW sludge are prohibited. Specific prohibitions preclude the discharge of pollutants to POTWs that • Create a fire or explosion hazard in the POTW; are corrosive (pH<5.0) • Obstruct flow resulting in interference • Are dischared at a flow rate and/or concentration that will result in interference • Increase the temperature of wastewater entering the treatment plant that would result in interference, but in no case raise the POTW influent temperature above 104·F).		40 CFR 403.5 (Part 403-General Pretreatment Regulations for Existing and New Sources of Pollution. Section 5-National Pretreatment Standards; Prohibited Discharges.)	"Applicable" to Alterntive C3 and C4 as it pertains to discharge of aqueous to a POTW treatment facility.
	• Discharge must comply with local POTW pretreatment program, including POTW-specific pollutants, spill prevention program requirements, and reporting and monitoring requirements;		40 CFR 403.5 and local POTW regulations.	

ACTION SPECIFIC FEDERAL ARARS
AND CRITERIA, ADVISORIES & GUIDANCES TO BE CONSIDERED
KIN-BUC FEASIBILITY STUDY

Action	Requirement	Prerequiste(s)	Citation	Potential Applicability
	• RCRA permit-by-rule requirements must be compiled with for discharges of RCRA hazardous wastes to POTWs by truck, rail, or dedicated pipe.		40 CFR 264.71 and 264.72 (Manifest System, Recordkeeping and Reporting).	
Excavation	Area from which materials are excavated may require cleanup to levels established by closure requirements.	Disposal by disturbance of hazardous waste and moving it outside the unit or area of contamination.	See Closure in this Exhibit (i.e., 40 CFR 264.111 closure performance standard, and 52 FR 8712, March 19, 1987).	Not considered to be "Applicable" (as it pertains to RCRA hazardous waste placed at the site after November 19, 1980), however, is "relevant and appropriate" to Alternative D.
Operation and Maintenance	Post-closure to ensure that site is maintained and monitored.		40 CFR 264.1 (Closure and Post Closure)	"Relevant and Appropriate" to Alternatives C3 and C4.
Surface Water Control	Prevent run-on and control and collect run-off from a 24-hour, 25-year storm (waste piles, land treatment facilities, landfills).		40 CFR 264.301(c).(d) 40 CFR 264.251(c).(d)	"Relevant and Appropriate" to Alternatives C3 and C4. "Applicable" to Alternative D if it is necessary for any reason to construct a waste pile on-site to contain excavated wastes prior to off-site disposal.
	Prevent overtopping of surface impoundment.		40 CFR 264.221(c)	"Applicable" to Alternatives C3 and C4 if a surface impoundment is constructed on-site as part of aqueous pretreatment prior to off-site disposal. "Applicable" to Alternative D if it is necessary for any reason to construct a surface impoundment on-site to contain excavated wastes prior to off-site disposal.

A NDIX 3
ACTION SPECIFIC FEDERAL ARARS
AND CRITERIA, ADVISORIES & GUIDANCES TO BE CONSIDERED
KIN-BUC FEASIBILITY STUDY

Action	Requirement	Prerequisite(s)	Citation	Potential Applicability
Treatment	Proposed standards for miscellaneous units (long-term retrievable storage, thermal treatment other than incinerators, open burning, open detonation, chemical, physical, and biological treatment units using other than tanks, surface impoundments, or land treatment units) require new miscellaneous units to satisfy environmental performance standards by protection groundwater, surface water, and air quality, and by limiting surface and subsurface migration.	Proposed standard; to be considered	50 FR 40726 (November 7, 1986) 40 CFR 264 (Subpart X)	Proposed standard, to be considered but may be "applicable" in the future to Alternatives C3 and C4 as it pertains to on-site pretreatment of aqueous.

A NDIX 3
ACTION SPECIFIC FEDERAL ARARS AND CRITERIA, ADVISORIES & GUIDANCES TO BE CONSIDERED
KIN-BUC FEASIBILITY STUDY

Action	Requirement	Prerequisite(s)	Citation	Potential Applicability
Treatment	Proposed standards for miscellaneous units (long-term retrievable storage, thermal treatment other than incinerators, open burning, open detonation, chemical, physical, and biological treatment units using other than tanks, surface impoundments, or land treatment units) require new miscellaneous units to satisfy environmental performance standards by protection groundwater, surface water, and air quality, and by limiting surface and subsurface migration.	Proposed standard; to be considered	50 FR 40726 (November 7, 1986) 40 CFR 264 (Subpart X)	Proposed standard, to be considered but may be "applicable" in the future to Alternatives C3 and C4 as it pertains to on-site pretreatment of aqueous.

AND CRITERIA, ADVISORIES & GUIDANCES TO BE CONSIDERED
KIN-BUC FEASIBILITY STUDY

ACTION	REQUIREMENT	Perequisite(s)	Citation	Potential Applicability
Consider Storage (On-Site) cont.	At closure, remove all hazardous waste and residues from the containment system, and decontaminate or remove all containers, liners.	See Previous Page	40 CFR 264.178	See Previous Page
Containment (Construction of New Surface Impoundment (On-Site) (See Closure with Waste in Place and Clean Closure)	Use two liners, a top liner that prevents waste migration into the liner and a bottom liner that prevents waste migration through the liner throughout the post-closure period.	RCRA hazardous waste (listed or characteristic) currently being placed in a surface impoundment.	40 CFR 264.220 (Surface impoundments)	"Applicable" to Alternativdes C3 and C4 if a surface impoundments is constructed on-site as part of aqueous pretreatment prior to off-site disposal, and "applicable" to Alternative D if it is necessary for any reason to construct a surface impoundment on site to contain excavated wastes prior to off-site disposal.
	Design liners to prevent failure due to pressure gradients, contact with the waste, climatic conditions, and the stress of installation and daily operations.		40 CFR 264.221 (Surface Impoundments)	
	Provide leachate collection system between the two liners.			
	Use leak detection system that will detect leaks at the earliest possible time.			
Tank Storage (On-Site)	Tanks must have sufficient shell strength (thickness), and for closed tanks, pressure controls, to assure that they do not collapse or rupture.	RCRA hazardous waste listed or characteristic, held for temporary period before treatment, disposal, or storage elsewhere (40 CFR 264.10) in a tank.	40 CFR 264.190	"Applicable" to Alternatives C3 and C4 as it may pertain to on-site pretreatment of aqueous prior to off-site disposal, and "applicable" to Alternative D if on-site tank storage is used to contain excavated wastes prior to off-site disposal.
	Waste must not be incompatible with the tank material unless the tank is protected by a liner or by other means.		40 CFR 264.191	
	Tanks must be provided with controls to prevent overfilling, and sufficient freeboard maintained in open tanks to prevent overtopping by wave action or precipitation.		40 CFR 264.194	

AND CRITERIA, ADVISORIES & GUIDANCES TO BE CONSIDERED
KIN-BUC FEASIBILITY STUDY

Action	Requirement	Pre isite(s)	Citation	Potential Applicabil
Tank Storage (On-Site) cont.	nspect the following: overfilling control, control equipment, monitoring data, waste level (for uncovered tanks), tank condition, above ground portions of tanks (to assess their structual integrity) and the area surrounding the tank (to identify signs of leakage).	See Previous Page	40 CFR 264.195	See Previous Page
	Repair corrosion, cracks, or leaks.		40 CFR 264.196	
	At closure, remove all hazardous waste and hazardous waste residues from tanks, discharge control equipment, and discharge confinements structures.		40 CFR 264.197	
	Stores ignitable and reactive waste so as to prevent the waste from igniting or reacting. Ignitable or reactive wastes in covered tanks must comply with buffer zone requirements in "Flammable" and Combustible Liquids Code," Tables 2-1 through 2-6 (National Fire Protection Association, 1976 or 1981).		40 CFR 264.198	
	Use liner and leachate collection and removal system	RCRA hazardous waste, noncontainerized accumulation of solid, non-flammable hazardous waste that is used for treatment or storage.	40 CFR 264.251	"Applicable" to Alternative D if it is necessary for any reason to construct waste pile on site to contain excavated wastes prior to off-site disposal.

APPENDIX 3
ACTION SPECIFIC STATE ARARS AND CRITERIA, ADVISORIES & GUIDANCES TO BE CONSIDERED
KIN-BUC FEASIBILITY STUDY

Action	Requirement	Prerequisite(s)	Citation	Potential Applicability
Air Stripping	An air pollution control permit is required for any wastewater treatment equipment if the concentration of certain delineated toxic volatile organic substances exceed 100 ppb by weight and the total concentration of VOS exceed 3,500 ppb by weight. Must demonstrate that controlled emissions will not violate ambient air quality standards as defined in NJAC 7:27-13, Title 40 Part 52 CFR, or other department criteria. Must demonstrate that the control apparatus incorporates state-of-the-art air pollution control equipment, and is designed to operate without violating laws or regulations by presenting such information as: description of processes, raw materials, operating procedures, physical and chemical nature of air contaminants, volume of gas discharge, etc.	Action that includes water or wastewater treatment equipment which emits air contaminants including: air stripping equipment, aeration basins and lagoons.	NJAC Title 7, Chapter 27, Subchapter 8.	Although under CERCLA Section 121(e), on-site remedial response actions are exempt from having to obtain Federal, State, or local permits, the substantive requirements of this citation may be considered "applicable" to Alernative C3 and C4 as it pertains to possible on-site aqueous pretreatment (air stripping) prior to off-site aqueous disposal.
Landfill Vents	An air pollution control permit is required. (See above discussion under air stripping.)	Action that includes equipment used for the purpose of venting a closed or operating dump or solid waste facility directly or indirectly into the outdoor atmosphere.	NJAC Title 7, Chapter 27, Subchapter 8.	Although under CERCLA Section 121(e), on-site remedial response actions are exempt from having to obtain Federal, State or local permits, this citation may be considered "relevant and appropriate" to Alternatives C3 and C4 as it pertains to landfill venting.

APPENDIX 3
ACTION SPECIFIC STATE ARARS
AND CRITERIA, ADVISORIES & GUIDANCES TO BE CONSIDERED
KIN-BUC FEASIBILITY STUDY

Action	Requirement	Prerequisite(s)	Citation	Potential Applicability
Off-Site Transportation of Hazardous Waste	All vehicles containing hazardous waste must meet the placard requirements of USDOT transport of hazardous waste (i.e., 49 CFR 171 through 49 CFR 177). All containers shall be in conformance with the construction type and labeling requirements (manifest numbers, etc.) of USDOT containerization requirements (49 CFR 171 through 49 CFR 179). Special Hazardous Waste Manifest Form(s) Requirements (which depends upon State destination). Special recordkeeping requirements and prohibitions for the hazardous waste generator, hauler, receiving facility. etc.	On-site removal of hazardous waste for off-site treatment/disposal.	NJAC Title 7, Chapter 26, Sub-Chapter 7 (Labeling, Records, and Transporation Requirements). NJAC Title 7, Chapter 26, Subchapter 8 (Hazardous Waste Criteria, Identification and Listing).	Directly "applicable" to Alternative D. Maybe partially applicable to Alternatives C3 and C4 as pertains to: • On-site pretreatment of aqueous for removal of PCB laden oil for off-site disposal/treatment, and c • Collection of on-site aqueous waste stream for off-site treatment/diposal (this would depend upon contaminant concentrations in the aqueous waste stream).
Direct Discharge of Treatment System Effluent	No person shall build, install, modify, or operate any facility for the collection, treatment or discharge of any pollutant except in conformance with the New Jersey Pollutant Discharge Elimination System (NJPDES) Program. The NJPDES Program requirements include, where applicable, permits or approvals for both on-site treatment with direct surface water discharge, as well as discharge to off-site municipal or privately owned treatment works.		NJAC 7:14A	"Applicable" to Alternatives C3 and C4 as it pertains to both: possible on-site aqueous pretreatment for off-site discharge to a POTW, as well as to possible on-site aqueous treatment with direct surface water discharge.

APPENDIX 3
ACTION SPECIFIC STATE ARARS
AND CRITERIA, ADVISORIES & GUIDANCE TO BE CONSIDERED
KIN-BUC FEASIBILITY STUDY

Action	Requirements	Prerequisite(s)	Citation	Potential Applicability
Discharge to POTW or Other Aqueous Treatment Works Via Sewer	No persons shall cause, suffer, allow, or permit the discharge of any hazardous waste into a sewer system unless: • Final approval has been obtained from all appropriate State and local authorities; and • All conditions imposed prior to discharge are met		NJAC Title 7, Chapter 26 Sub-Chapter 9 (Requirements for Hazardous Waste Facilities) Section 2.	Directly "applicable" to Alternatives C3 and C4 as pertains to discharge of aqueous via sewer line to off-site POTW treatment facility.
Container Storage On-Site	Presents standards for use and management of on-site container storage of hazardous waste. Includes separation of incompatible waste materials, safety considerations, environmental protectiveness considerations, recordkeeping, monitoring, inspection, training, etc.	On-site removal of hazardous waste in preparation for off-site disposal/treatment.	NJAC Title 7, Chapter 26, Sub-Chapter 9 Requirements for Hazardous Waste Facilities), Section 4, and NJAC Title 7, Chapter 26, Subchapter 10 (Additional Operation and Design Standards), Section 4.	May be directly "applicable" to Alternative D and partially "applicable" to Altenative C3 and C4 as pertains to on-site preteatment of aqueous for removal of PCB laden oil for off-site disposal/treatment.
Groundwater Monitoring	Must institute groundwater monitoring in accordance with NJAC 7:124 A-6 (Rule of the Division of Water Resources).		NJAC Title 7, Chapter 26, Sub-Chapter 9 (Requirements for Hazardous Waste Facilities) Section 5.	"Relevant and appropriate" to Alternatives A, C3 and C4.

ACTION SPECIFIC STATE ARARS
AND CRITERIA, ADVISORIES GUIDANCES TO BE CONSIDERED
KIN-BUC ASIBILITY STUDY

Action	Requirement	Prerequisite(s)	Citation	Potential Applicability
Safety	Facilities shall be designed, constructed, operated and maintained to prevent unplanned sudden events that threaten human health or the environment and contingency plans should be developed for emergencies.		NJAC Title 7, Chapter 26, Subchapter 9 (Requirements for Hazardous Waste Facilities), Sections 6 and 7	"Relevant and appropriate" to Alternatives C3 and C4 and Alternative D.
Closure with Waste In-Place (Capping)	Preparation of a closure plan that minimizes the need for further maintenance and controls, minimizes or eliminates, to the extent necessary to protect human health and the environment, post-closure escape of hazardous waste, hazardous waste constituents, leachate, contaminated rainfall, or waste decomposition products to the groundwater, surface water or atmosphere. Plan should include decontamination of facility equipment, scheduling, and closure procedures. Design standards for caps Post-closure care an groundwater monitoring (includes maintenance and monitoring and montoring of wate containment systems, as applicable.		NJAC Title 7, Chapter 26, Subchapter 9, Sections 8 and 9 (Requirements for Harazardous Waste Facilities General Closure and Post Closure Requirements) NJAC Title 7,Chapter 26, Subchapter 10, Section 8(Additional Operational and Design Standards for Hazardous Waste Facilities Landfills)	"Relevant and apporiate" to Alternative 3 and C4.

APPENDIX 3
ACTION SPECIFICS STATE ARARS
KIN-BUC FEASIBLITY STUDY

ACTION	REQUIREMENT	PREREQUISTITE(S)	CITATION	POTENTS APPLICABILIY
Closure with Waste In-Place(Capping)cont.	Drainage and erosion control standanrds. Gas venting and gas montoring requirements.		See previous page	See previous page
Chemical, Physical, and Biological Treatment	General operating and inspection requirements		NJAC Title 7, Chapter Subchapter 9,(Additional Requirements for Hazaradous Waste Facilities Operating under Exsisting Facility Status),Section 7	"Applicable" to Alternatives C3 and C4 as it pertains to possible on-site pretreament of aqueous prior to removal for off-site treatment.

APPENDIX 4

COMMUNITY RELATIONS HISTORY

Operational practices at the landfill in the early to mid-1970's resulted in a large number of citizens complaints, caused frequent on-site fires and a number of serious occupational injuries. The available information on community concerns indicates that these compliants began prior to 1976.

An article published in the Newark Star-Ledger on May 14, 1976, refers to a petition by "angry residents" who complained of air and water pollution and several chemical fires caused by the Kin-Buc Landfill. According to this article, several citizens have complained to Township regarding the local government's inability to stop both the noxious smoke that emanated from the site when it burned and the trucks that drove through residential areas at 4:00 a.m. on the way to the landfill.

Several articles published in local newpapers in the following year presented developments at the site, including the closure plan that DEP had accepted from Kin-Buc, the extension to the closure deadline that the site was issued by the Superior Court, and the June 1976 formation of a citizens' group known as "Citizen's Committee to Close Kin-Buc". According to these articles, the Citizens Committee discovered that Kin-Buc had been issued an extention in March 1977 allowing it to remain open until June and promptly began a letter-writing campaign to high-ranking State officials. The leader of the group stated that the Township had not been given sufficient notice to fight the extension. The Township appealed the extension and the Superior Court Judge deciding the case initially revoked the extension, but reinstated it five weeks later.

Following the eventual closure of the site, public interest subsided and the citizens began to concentate on getting the site cleaned up. In July 1981, a citizens' group called "Coalition to Contain Kin-Buc" wrote a letter to Senator Bill Bradley asking his help in forcing EPA to name the site as a priority. Senator Bradley forwarded the letter to the Acting Regional Administrator for EPA, Region II. The site was added to the National Priorities List of hazardous waste sites (NPL) in October 1981. At time of the NPL listing, EPA proposed an experimental hazardous waste incinerator as a possible remedial measure for the site. This proposal met with extension public opposition and was subsequently dropped.

The following year, 95 residents of the area surrounding the Kin-Buc site filed a lawsuit against the Township and 600 businesses that allegedly disposed of waste at Kin-Buc to collect damages caused by contamination from the landfill. The Township settled out of court and in 1985 citizens lobbied for a jury trail for the lawsuit against the remainder of the defendants. The right to a jury trial was eventually granted in 1986. The citizens and defendants reached a 2.7 million dollar settlement in May 1988.

Although the Kin-Buc site received much media and community attention during its years of operation, the frequency of complaints or spoken concerns on the part of the public declined dramatically following closure of the site. Of the few concerns that have arisen in the recent past, according to those interviewed, the most prevalent is the danger of adverse human health resulting from direct contact with the contaminants at the site. Concerned parties cite air, groundwater, and surface water s primary means for human contact with the hazardous materials.

APPENDIX 5

RATIONALE FOR OPERABLE UNIT II COMPONENTS

- Mound B

Although it is believed that the majority of hazardous waste disposal occurred in the Kin-Buc I mound; little is known about the contents of Mound B. It is believed that municipal trash extends beneath Mound B. However, Mound B was not a subject of the remedial investigation or previous investigatory work dating to the mid-1970's. In addition, Mound B is physically separated by the Edison Landfill access road. For these reasons, EPA determined that the need to evaluate the nature and extent of contamination in Mound B could be conducted as part of Operable Unit II.

- Raritan River/Mill Brook/Martins Creek/Edmonds Creek

Initial attempts to determine the nature and extent of surface water and sediment contamination date back to 1974 by analyzing samples from the Raritan River. Sampling and analysis of the Raritan River conducted to date has been sporadic and does not take into account potential seasional variations in contaminant movement. Limited analytic data indicate the potential for surface water and sediment contamination in the Raritan River from groundwater discharges and surface run-off from the site.

However, the selected remedy for Operable Unit I would provide source control measures such that the Raritan River and sediments would no longer be a receptor of releases from the site. Remedy selection for source control measures at the site is considered the critical pathway in the overall site clean-up.

The Mill Brook and Martins Creek surface waters have not been the focus of any detailed investigatory work. Limited sampling and analysis of Martin Creek sediments indicate potential PCB contamination due to leachate from the site entering Martins Creek. Currently, control measures at the site prevent the release of leachate into Martins Creek. The selected remedy for Operable Unit I provides source control measures to prevent releases to Martins Creek from the site.

Edmonds Creek sediments were the focus of a sampling program conducted in 1983. Until installation of the Kin-Buc I cap in 1980 and on-going control measures, leachate was released into Edmonds Creek from Pool C via a connecting channel. Sampling and analysis to date indicate PCB contamination in Edmonds Creek. In additional, several fish and inverterbrate species from Edmonds Creek were shown to have elevated levels of contaminants in their tissue. However, the nature and extent of contamination needs to be evaluated more extensively.

- adjacent wetlands

  The wetlands adjacent to the Kin-Buc Landfill site have never been the focus of any previous investigations. Potential environmental effects of uncontrolled releases from the site exist. Various aquatic and terrestrial species utilize the adjacent wetlands as their habitant. Therefore, the need to fully evaluate the nature and extent of contamination and any environmental effects of such contamination exists.

- groundwater contamination emanating from the site

  The hydrogeology of the site is complex and has not been fully characterized. Uncertainties exist, for example about the nature and extent of bedrock aquifer contamination and the possibility of a connection between the sand and gravel aquifer and the Raritan River. The extent of migration of contaminants in the groundwater has not been fully evaluated to date.

The evaluation of the components of Operable Unit II were deferred so as not to delay implementation of source control measures at the site.